THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. CXI. No. 2464.] LONDON, AUGUST 2, 1910. [62ND YEAR. PRICE 6d.

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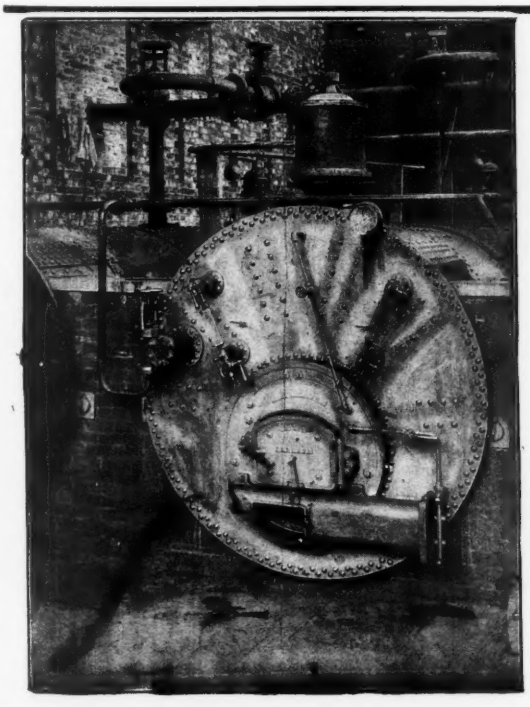

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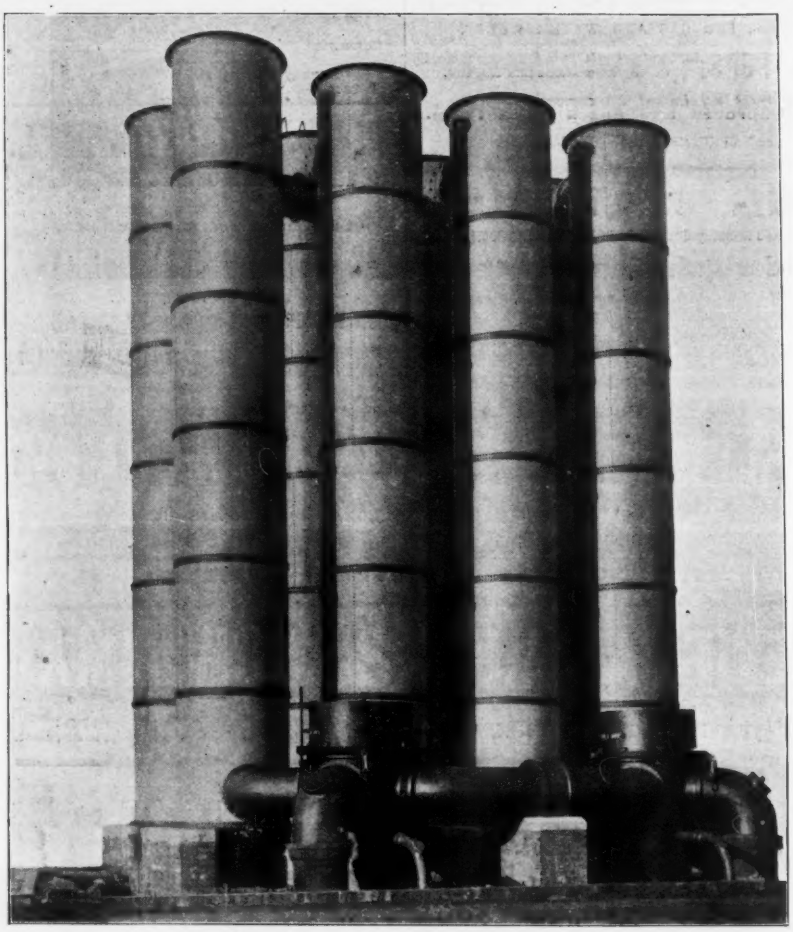

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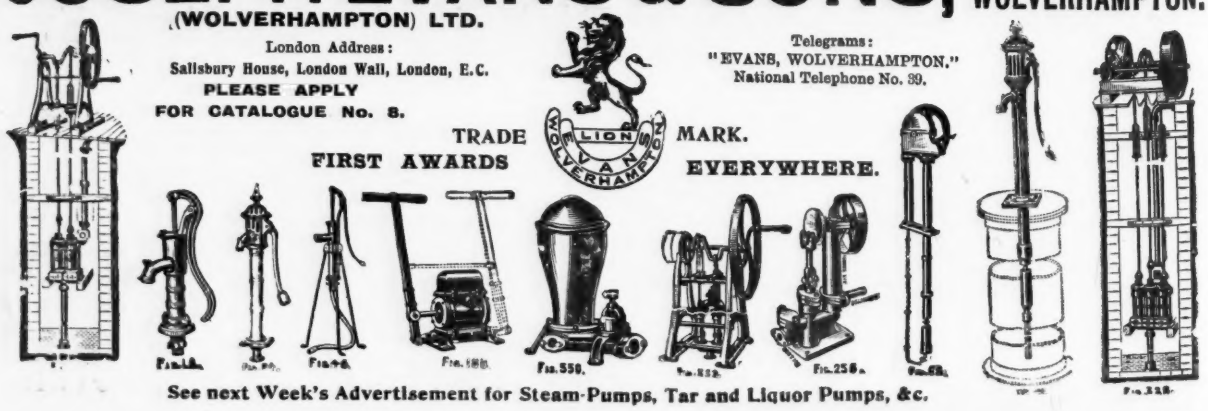

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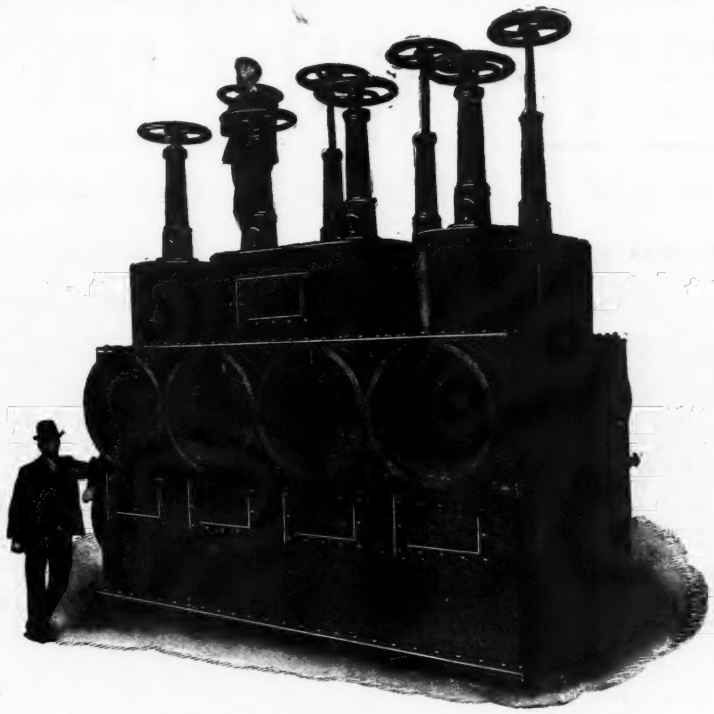

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[See Illustrated Advertisement, July 19, p. 162.]

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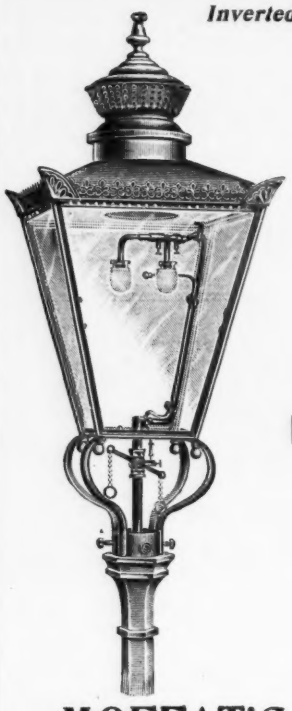
Inverted Adaptations to fit any Size Lantern.



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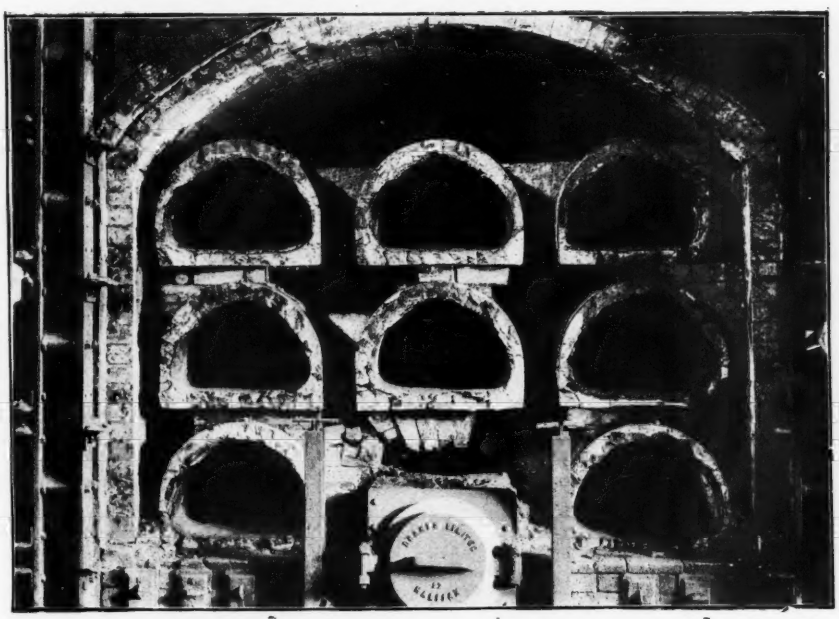
Special Patent Expanding Dies for making Taper Retorts at one operation.



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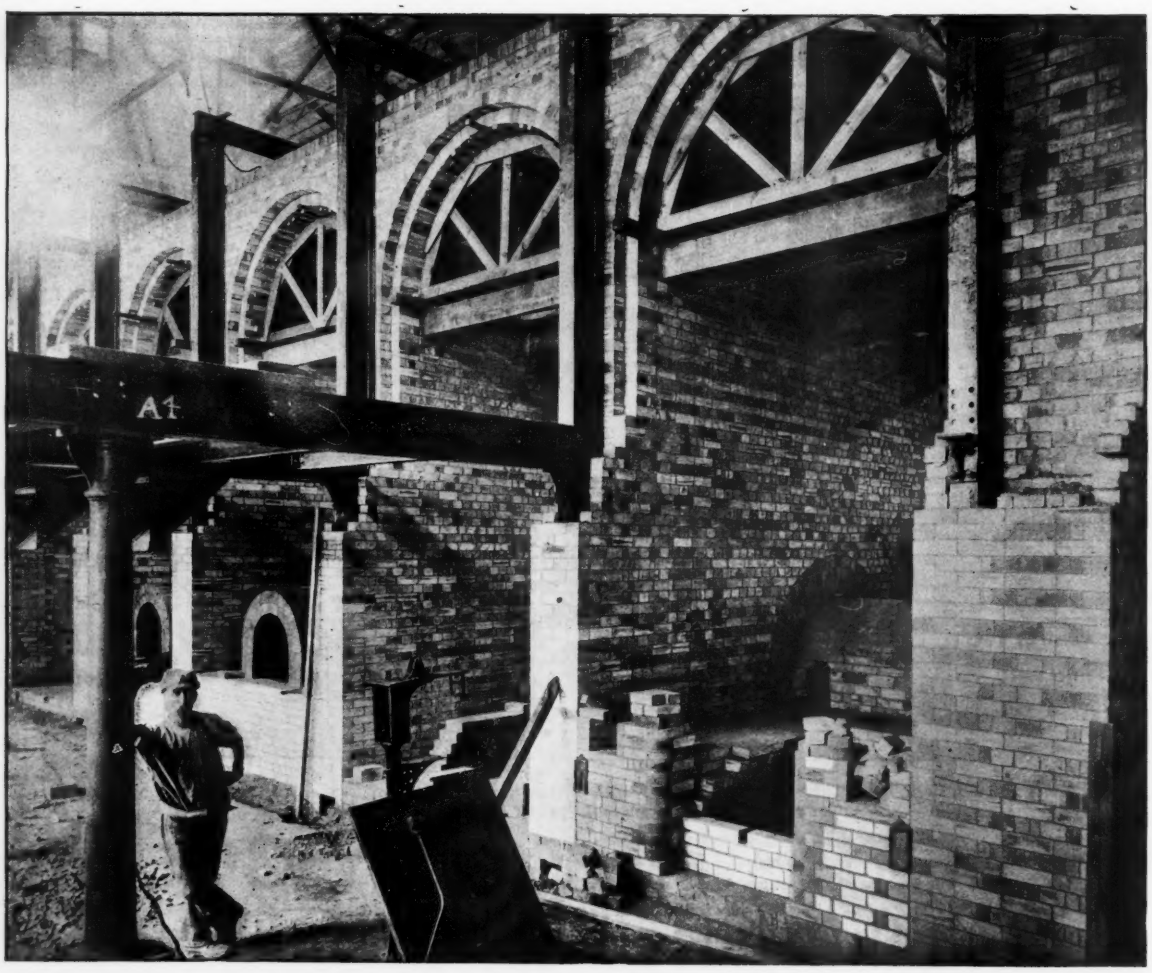

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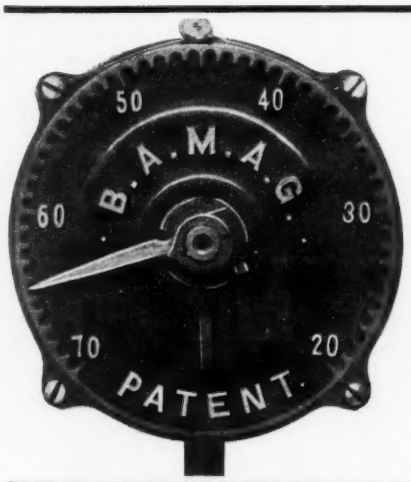

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RADIATE MORE HEAT

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SILCO BRICKS prevent all settling of setting.

SILICA BRICKS for Combustion Chambers, any shape.

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"HURDLE" GRIDS.

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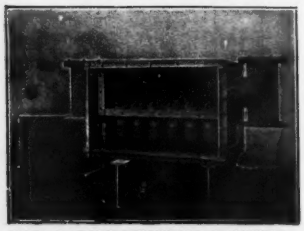

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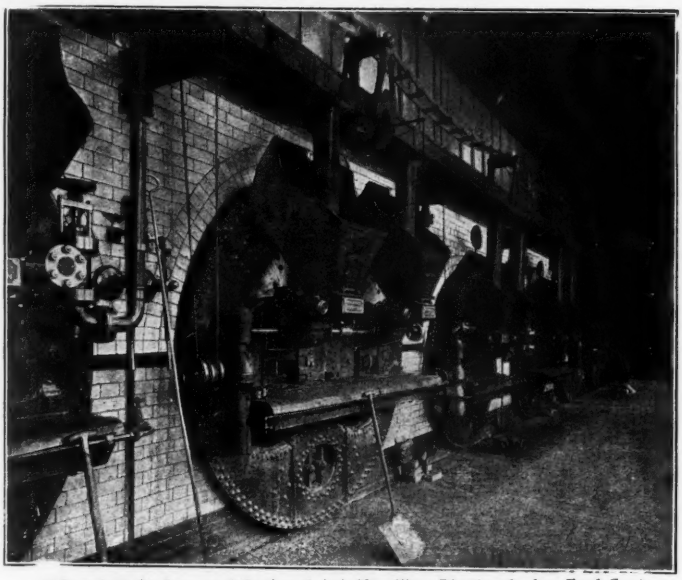
There is the greatest need that those responsible for the conduct of gas-works should keep down the costs of production. It is therefore requisite that all the processes of manufacture should be carried out under a system of true economy. The system, to meet all requirements, must be thorough; it must begin at the beginning and include each and every department. Some gas-works are conducted on such short-sighted principles that the attempts made in the direction of economy may be likened to those of the foreman who pressed his workmen to fill empty sacks at top speed, regardless of the fact that the sand was pouring out through neglected holes almost as fast as it was poured in!



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Consider, for instance, the unloading of coal from barges. How many gas-works can tell as good a story as that of the Coventry Corporation, whose unique method leaves nothing to be desired, and is carried out at a minimum of cost? The bunkerage of coal and its consumption in the boiler-house as well as its conveyance to the retorts are questions fraught with special interest from the point of view of economy.

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By the installation of "Bennis" stokers and self-cleaning compressed air furnaces an increased evaporation is secured from the boilers, and a constant and regular supply of cheap steam is ensured from coke-breeze. It frequently follows that by the use of these machines the increase in evaporation is so great that it is not necessary to keep all the boilers working, those put out of work being kept as a stand-by in case of need. In other instances the boilers are worked alternately, which has the effect of considerably prolonging the life.

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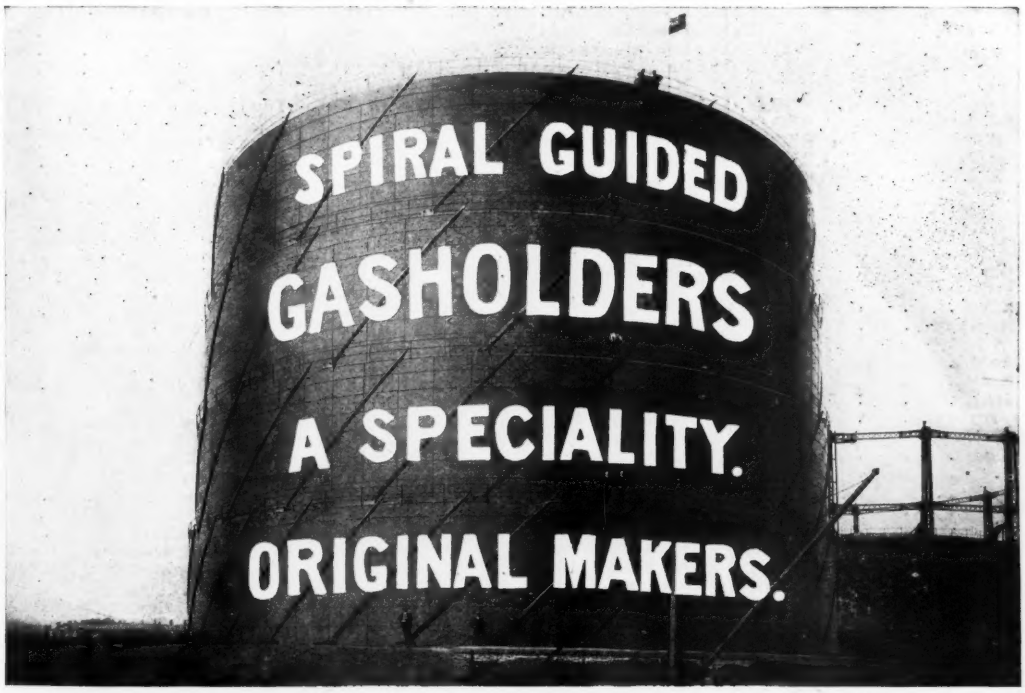

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Birmingham	1,500,000	Haarlem, Holland	850,000	St. Albans	700,000
Bishop's Stortford	200,000	Hamburg, Germany	1,750,000	St. Gallen, Switz.	225,000
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Bournemouth (2nd)	500,000	Heidelberg, Germany	200,000	Scarborough	800,000
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Bremen (2nd)	950,000	Hong Kong	450,000	Shanghai	225,000
Bremen (3rd)	850,000	Hull	1,500,000	Shanghai (2nd)	225,000
Brentford	1,200,000	Ilford	650,000	Shanghai (3rd)	1,600,000
Brentford (2nd)	850,000	Innsbruck, Austria	200,000	Southampton	800,000
Brentford (3rd)	350,000	Ipswich	750,000	Southampton (2nd)	500,000
Bridgwater	200,000	Kampen, Holland	350,000	Southampton (3rd)	600,000
Bridlington	150,000	Kiel, Sleswig	1,000,000	Southgate	400,000
Bridlington (2nd)	200,000	Kiel (2nd)	880,000	Southport	750,000
Brieg, Silesia	100,000	L. & N.W. Rly., Crewe	700,000	Southport (2nd)	900,000
Brighton	1,750,000	Lausanne, Switz.	250,000	South Shields	650,000
Brighton (2nd)	1,850,000	Lawrence, Mass.	400,000	Stafford	500,000
Bromley	1,500,000	Lea Bridge	350,000	Staines	600,000
Bruges, Belgium	200,000	Lea Bridge (2nd)	350,000	Stettin, Germany	880,000
Brussels—Anderlecht	350,000	Lea Bridge (3rd)	400,000	Stockholm	1,500,000
Brussels—Anderlecht (2nd)	350,000	Lea Bridge (4th)	1,000,000	Stockholm (2nd)	1,750,000
Brussels—Forest	1,000,000	Leeuwarden, Holland	400,000	Stockport	600,000
Brussels—Koekelberg	1,000,000	Leiden, Holland	500,000	Stockport (2nd)	600,000
Brussels—St. Gilles	1,000,000	Leiden (2nd)	575,000	Stockport (3rd)	400,000
Brussels—St. Josse	1,000,000	Leigh, Lancs.	350,000	Stockton-on-Tees	500,000
Brussels—St. Josse (2nd)	600,000	Lemberg, Galicia	260,000	Swansea	750,000
Brussels—St. Josse (3rd)	775,000	Lemberg (2nd)	500,000	Swansea (2nd)	1,000,000
Brussels—Ville	750,000	Liége, Belgium	1,000,000	Swansea (3rd)	450,000
Brussels—Ville (2nd)	750,000	Liége (2nd)	750,000	Swindon	300,000
Brussels—Ville (3rd)	1,500,000	Lincoln	500,000	Swindon (2nd)	450,000
Brussels—Ville (4th)	350,000	Liverpool	3,500,000	Sydney—Harbour	500,000
Bucarest, Roumania	1,100,000	Liverpool (2nd)	4,500,000	Sydney—Harbour (2nd)	500,000
Budapest, Hungary	50,000	Liverpool (3rd)	750,000	Sydney—Mortlake	500,000
Budapest (2nd)	1,750,000	Longton	600,000	Sydney—Mortlake (2nd)	500,000
Carlisle	600,000	Louvain, Belgium	800,000	Syracuse, N.Y.	850,000
Carlsruhe, Germany	500,000	Lübeck, Germany	400,000	Taunton	225,000
Chigwell	350,000	Maastricht, Holland	200,000	Taunton (2nd)	350,000
Chorley	300,000	Magdeburg, Germany	1,400,000	The Hague Holland	1,000,000
Commercial, London	850,000	Maidenhead	225,000	The Hague (2nd)	500,000
Commercial (2nd)	850,000	Maidenhead (2nd)	225,000	Tilburg, Holland	400,000
Commercial (3rd)	1,250,000	Maidstone	500,000	Torquay	350,000
Commercial (4th)	2,000,000	Malines, Belgium	500,000	Tottenham	750,000
Copenhagen	700,000	Malmö, Sweden	350,000	Tottenham (2nd)	750,000
Copenhagen (2nd)	2,500,000	Malta	400,000	Tottenham (3rd)	350,000
Courtrai, Belgium	250,000	Manchester	3,500,000	Tottenham (4th)	1,000,000
Coventry	600,000	Manchester (2nd)	3,500,000	Tottenham (5th)	1,000,000
Coventry (2nd)	600,000	Mansfield	330,000	Tottenham (6th)	1,250,000
Cracow, Galicia	200,000	Marlborough	100,000	Tunbridge Wells	1,000,000
Cracow (2nd)	200,000	Mayence, Germany	700,000	Utrecht, Holland	1,000,000
Crefeld, Germany	500,000	McKeesport, Pa.	500,000	Utrecht (2nd)	1,000,000
Croydon	1,250,000	Merthyr Tydfil	300,000	Verviers, Belgium	1,000,000
Croydon (2nd)	625,000	Middlesbrough	1,250,000	Vienna	3,500,000
Croydon (3rd)	625,000	Namur, Belgium	175,000	Vienna (2nd)	2,500,000
Croydon (4th)	550,000	Nelson	400,000	Waltham	400,000
Debreczin, Hungary	100,000	Newburgh, N.Y.	600,000	Wandsworth & Putney	1,800,000
Deventer, Holland	150,000	New York	5,200,000	Watford	300,000
Deventer (2nd)	200,000	Nictheroy, Brazil	250,000	Watford (2nd)	350,000
Dorking	150,000	North Middlesex	150,000	Wellington, N.Z.	350,000
Dublin	2,000,000	North Middlesex (2nd)	200,000	West Bromwich	550,000
Dublin (2nd)	2,000,000	North Middlesex (3rd)	75,000	West Ham	1,500,000
Dublin (3rd)	650,000	Norwich	1,000,000	West Ham (2nd)	800,000
Dundee	1,500,000	Norwich (2nd)	300,000	Weston-super-Mare	350,000
Dunedin, N.Z.	150,000	Norwich (3rd)	500,000	Weston (2nd)	350,000
Dunedin, N.Z. (2nd)	275,000	Nottingham	1,000,000	Wexford, Ireland	100,000
Durham	200,000	Nottingham (2nd)	1,000,000	Wiesbaden, Germany	850,000
Düsseldorf, Germany	1,000,000	Nuneaton	125,000	Winchester	225,000
Eastbourne	1,250,000	Oberhausen, Germany	175,000	Winchester (2nd)	125,000
Edinburgh	2,000,000	Oldenburg, Germany	200,000	Wolverhampton	1,500,000
Epsom	225,000	Ostend, Belgium	100,000	Zwolle, Holland	200,000
Epsom (2nd)	300,000	Ostend (2nd)	200,000	Zwolle (2nd)	200,000
Falmouth	150,000				

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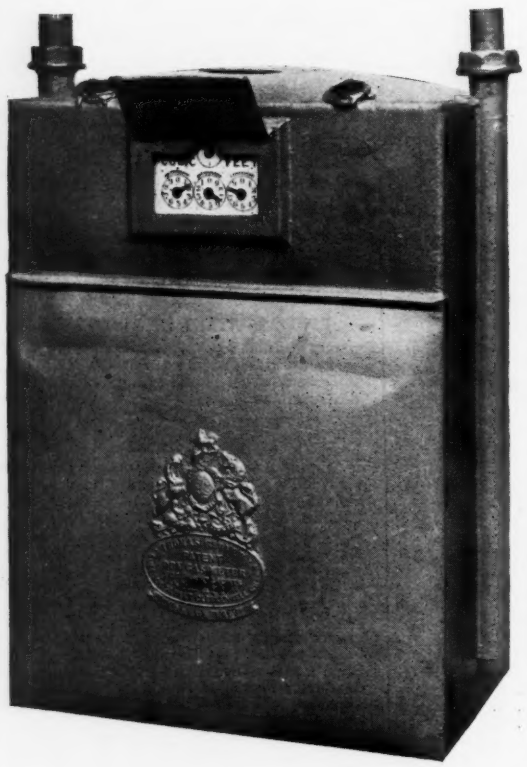

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EDITORIAL NOTES—GAS, &c.

First Effects of the New Gaslight Conditions.

IT may be regarded by some as being a little premature, at the close of six months' working of the enlarged Gaslight and Coke Company through the annexation of the West Ham Company's property and territory, and operating under the new Act (with the reduction of the illuminating power standard to 14 candles, as a partial offset to which is the calorific power standard), to say that the results of the working have proved the correctness of the Company's latest political changes. But to satisfy those who may be of that way of thinking, we will content ourselves by saying that the accounts for the past half year contain such substantial indications as to the wisdom of the policy—though there has not yet been time for more than preparatory work on the West Ham conditions—that we at any rate are exceedingly optimistic as to the future. For the purpose of enabling comparison to be made of the past half-year's results with those for the corresponding period of 1909, the revenue account figures of the then two separate Companies have been combined in marginal columns for the last-named period. This is useful, as otherwise a great deal of labour would have been entailed upon every individual who desired to make some contrast of the items—work that for all interested has been excellently done in the Accountant's Department of the Company. Taking the total figures first, the reductions in price that have been made in the old Gaslight area must be borne in mind. Before arriving at the totals, for the redemption fund there has been appropriated £10,000, for the reserve fund for the purposes of writing down the investment £10,000, and for the insurance fund £20,000; and if we turn to the revenue account, there is found a charge of £10,507 for retiring allowances under the Company's 1909 Act. The total balance is £430,150; and this when added to the amount brought forward gives £919,890 available for distribution. The payment of a dividend at the rate of £4 13s. 4d. per cent. on the ordinary stock will absorb £377,520, and thus leave £542,370 to be carried forward, which is £52,631 better than the sum conveyed into the half year.

There is no doubt that from the amalgamation we shall see several growing economies; but it will be difficult to bestow upon them any precise monetary value, seeing that concurrently the Gaslight Company are working to the reduced illuminating standard of 14 candles (which was the standard already existing in West Ham), though they have not been able to realize the full benefit of this lower standard through having to comply simultaneously with a calorific power standard. The new conditions and the improvement in manufacturing returns have to be rolled up together in considering the figures and savings. The quantity of coal carbonized during the half year was 922,779 tons, and the amount of oil used was 6,510,354 gallons, and of spirit only 42 gallons. The cost of the coal was £562,492, which is less by £61,746 than the two Companies paid in the corresponding period of 1909. Part of this saving is no doubt due to the reduced cost per ton, but not all—some being to the credit of enhanced yield per ton. On oil £59,107 was expended, which was a reduction of £38,226; and on coke and breeze for carburetted water gas manufacture £34,760 was spent, which is lower by £3311. The total of these three savings on raw material alone is £103,283. Notwithstanding, there was an increase of 1¾ per cent. in the quantity of gas sold; or, looking to the volume figures, the total sales were 12,375,374,000 cubic feet, which vast quantity represents an increase of 212,426,000 cubic feet—an amount alone equal to the total annual consumption of many a fair-sized town. This indicates an unbroken continuity of the tale of carbonizing improvement which commenced a few half years back, and of which more will, for certain, yet be heard. Still in the manufacturing department, the items of salaries, wages, and purification all show declines in cost. On repair and maintenance of works £184,298 was spent, which is a diminution of only about £6000, and so does not contribute much to the reduction of the total manufacturing expenses (£962,110) by £117,270, This is an extremely gratifying feature of the accounts. though it must not be expected that the next two succeeding half years will come out so well, inasmuch as, though oil contracts have been made at satisfactory rates, the coal contracts have had to be entered into at somewhat higher figures than last year. Distribution expenses amounted to £313,534, which is an increase of £38,932; but we see that close upon £24,000 more has been spent on the repair and maintenance of mains and service pipes. Casting the eye down the other items of expenditure, it is noticed that the half-year's co-partnership charge is £12,798; making a total for the year of £25,799. The half year also bears a charge of £1387 in relation to the quinquennial revaluations; and, as previously mentioned, there is an entry of £10,507 in respect of retiring allowances under the Company's Act of 1909. In passing, it is also of interest to note a drop by £1558 to £8542 in the bad debts. The total expenditure was £1,571,048, which is a decrease of £68,546.

In considering the income side of the revenue account, it must be remembered that, in the corresponding half year, the Gaslight and Coke Company were charging by meter (other than for public lighting and under contracts) 2s. 9d. and 2s. 5d. per 1000 cubic feet; while in the past half year, the prices were 2s. 8d. and 2s. 2d. Therefore, notwithstanding upwards of 212 million cubic feet more gas were sold, the receipts for gas per meter were, with a total of £1,553,947, £13,605 less than in the comparative half of 1909. And if we include public lighting and under contracts, the total reduction in income from gas (£1,623,644) was £25,892. Though the expansion of the gas business was 212 million cubic feet, there was a decrease of rather more than 28 millions in the consumption for public lighting. It must not, however, be taken that this diminution in public lighting consumption is entirely due to displacement of gas-lamps by electric-lamps in the areas of Borough Councils who happen to control electricity supply undertakings, and who bye-pass economy and efficiency in order to inflate the output of their own electricity stations. Part of the reduction is due to the growing use in the street lamps of the more economical inverted gas-lamp. Again, the lessening by 2935 of the total number of public lamps to 49,526 must not be entirely attributed to the wholesale absorption of the public lighting by Marylebone and other electricity ridden boroughs. Some of the reduction represents lamps of low candle power which have been superseded by fewer lamps of higher power. Of course, it must be acknowledged that the bulk of the loss is owing to the favouring of municipal electricity, and eschewing all consideration of the interests of the ratepayers at large, who are entitled to have the most efficient and most economical public lighting service, without any regard to the question of the ownership of the gas and electricity supplies. Passing on to the income from the rental of meters, stoves, and fittings, it is noticed that the total, £166,615, is up by nearly £3600. The revenue from residuals (£448,776) is better by £18,930—increases of a few thousand pounds being shown in every item. The total income was £2,244,268, which is a decrease of £3203. Having in view the large sum represented by a reduction of only 1d. in the price of gas in the case of a business of this magnitude, and having in view too the big decrease (£68,546) in expenditure, the reduction of £3203 in income may be looked upon as a mere bagatelle. The final result is that £673,219 is carried to the net revenue account, which is an advance of £65,342. It is a matter for congratulation that, with so much important change in the conditions of the Company, the computations of the Board as to the effects of their plans should have received this immediate tangible justification.

There is one interesting point as to the capital account. The outlay in the half year was £53,060; and the whole of

this, save £2915, has been laid out in the distribution department. Against the total of £53,060, £63,045 has been written off for depreciation of plant, meters, and stoves. The Board are wise in taking this course of solidifying the position of the Company. It is an aid in the protection of the future.

North British Presidential Address.

DUNFERMLINE gave the members of the North British Association a very hospitable welcome towards the end of last week; and this was unquestionably due to the position that Mr. Alexander Waddell, the Engineer and Manager to the Gas Commissioners, occupies in official and social capacities among his fellow townsmen. These, however, are matters that are dealt with in our report of the proceedings elsewhere. The technical work of the meeting claims attention here; but, in the first place, it is difficult to find much in Mr. Waddell's Presidential Address upon which to comment, as on all capital points one is in such complete accord with him.

The members met again under the shadow of loss, in the passing from the stage of life of Mr. Alexander Bell, whom the members revere as one of the fathers of the Association. There was in the address reference to this loss in well-chosen expression and sentiment. It was appositely followed by mention of the William Young Memorial Fund (the contribution to which the President regards as very satisfactory), and by a masterly appreciation of the life-work of that leader in thought, and labourer in the unravelling of chemical and physical problems. Most of us—the best and the most appreciative among us—are apt, with passing time, no matter how deeply a man has made impress on some particular line of work, to allow its value to fade from mind. But the members of the North British Association intend to keep green the memory of him who worked so intimately in conjunction with them, and gave them of the fruits of an exceptionally fine and fertile intellect. He worked with unremitting zeal, and brought a sharp penetrating capacity to bear on many questions appertaining to carbonization. We could welcome him now to assist in elucidating matters that are at the present time the subjects of hypothesis and theorizing. We want, for example, a definite explanation of the causes of the improved yields of gas, and other enhancement of result, from retorts worked after the most approved modes of the day. Those technicians who have thought over the matter have their own views; and the views are not all concordant. We saw this when Dr. Colman and Mr. Charles Hunt crossed swords at the last meeting of the Institution of Gas Engineers as to the sources of the increased yield, upon which point Mr. Waddell read an extract, practically *literatim*, from an editorial article in the "JOURNAL" dated June 21 (p. 773). From the section of the address dealing with carbonization, it is also gathered that the President's choice of vertical retort system has pronounced inclination towards the continuous or the continuous-intermittent, which, as our readers are aware, is a new development of Scotch conception, and about which we may hear more later from Glasgow and Edinburgh.

The President describes the coke-handling system that he has adopted to meet his special needs; and it strikes one, on such acquaintance as is permissible through the address, to be an economical and efficient plant in working. The greatest novelty in it is the cylindrical coke-quenching vessels, which no doubt have their disadvantages and compensating advantages. It can well be imagined that the length of time occupied in quenching in this manner is not the most economical; but the quenching being largely a matter of the deadening of the coke with self-generated steam from the water sprayed on to the incandescent material during its fall from the retorts into the quenching vessels, one can conceive an improvement in the coke compared with the depreciating treatment to which it is exposed by the usual drenching treatment. But the adoption of this system of deadening the coke was not with the view to its improvement, so much as to quench completely its effectual fires before depositing in the loading hopper; this being a matter of some importance where there has frequently to be prompt shipment.

Most engineers are having experience nowadays of high-pressure gas service to outlying villages; and Mr. Waddell is among them. An interesting experience of his in this connection is the distribution of gas in two villages at a pressure of 4½ inches; and, using inverted burners, this pressure is found satisfactory. In Mr. Waddell's opinion, sufficient consideration has not been given to the question of supplying to consumers gas at higher pressures than ordinarily; and, from his experience, he advances the view that with 4½-inch pressures in the street-mains, at least 90 per cent. of the complaints now received would not be heard of. The pressures of a past day in all well-ordered undertakings are not likely to be revived. With their increase down south, complaints have, it is true, diminished; but this gratifying condition has synchronized with the supply of a lower grade of illuminating gas. With the appreciation of the address expressed at the meeting we heartily concur.

Gaseous Fuel and Works' Costs.

THE two papers that were read at the meeting of the North British Association had a bearing one upon the other. This may perhaps be said of any two papers one of which deals with the sale and price of gas and the other with any plan or system that conduces to economy in the manufacturing department. The two papers now under observation were by Mr. J. W. Napier, of Alloa, and Mr. James Dickson, of Forfar—their subjects being respectively "Gaseous Fuel: "The Duty of Gas-Supply Authorities to the Public," and "The Checking of Working Costs in Small Gas-Works." Among the managements of large, medium, and small works, there is an expanding view as to the desirabilities of the times. The formulæ of gas-works practices that were recited and acted upon in the past as being unimpeachably orthodox, have had to be remodelled to suit the circumstances of the day, though here and there there is survival through inaction, to the disadvantage of both undertakings and consumers. Mr. Napier speaks of the duty of gas-supply authorities to the public. The phrase is good as it stands; but in respect of the term "public," there can be substitution by the term "undertaking." There is an all too narrow view among many gas-supply authorities as to what are the full functions of the undertakings under their charge; and if they would look broadly at their position from this standpoint of functional ability, they would soon be striving to the goal of maximum duty to the public. A gas-works should be the central station for gaseous fuel, at a commercially competitive price, for lighting, for heating, and for power; and these branches of the business should be severally developed on the broadest possible lines, each directed by the nature of the competition it has to meet.

In considering the subject of duty, Mr. Napier narrows it down to duty from the aspects of prices and facilities for developing the heating business; and he keeps severely off that—for Scotland—very controversial, but still cognate, question of low-illuminating grade gas for heating purposes. In our view, this question to-day is inseparable from any discussion of gaseous heating and gas prices. And it is inseparable from the question of the development of the highest efficiency of heating appliances and of gas-engines. "Gaseous Fuel" is the main title of the paper; and a gas that is very rich in illuminating hydrocarbons is not the best "gaseous fuel," through the impossibility of getting a proper admixture of air and such gas. We want the right gas to meet the largest proportion of the uses to which the gas is put. And for these uses the richer the illuminating properties of a gas, Professor Hopkinson and Captain H. Sankey have told us, the greater the liability to incomplete combustion, to carbon deposition, and (in engines) to pre-ignition. And so, within limits, we have it that a gas that is of lower grade than that usually supplied in Scotland, is not only more efficient for the purposes of the present day, but it follows that a reduction from those high-grade illuminating powers must result in various manufacturing economies—through the abolition of enrichment, and the opening-up of ability to produce more gas per ton of coal carbonized—that it is the "duty" of gas-supply authorities to realize for the benefit of the public and of the gas undertakings they control.

Alloa has done extremely well for the public, and yet a high illuminating power gas is supplied. Alloa might do better still for the public in the matter of efficiency and price, if a lower illuminating grade gas were distributed. The price of gas is admittedly low; the average consumption per consumer, both ordinary and slots, is good. The proportion of ground unoccupied for lighting is diminishing through increase of occupation and competition; the point of saturation has almost been reached for cooking; gas is supplied for power at 1s. 4d. to 1s. 10d.; and so suction gas

is foreign to the town. The open field is gas-fires; but it is a question of price. In this field there is a commercial asset of such practical value to gas undertakings, and of considerable benefit to the public, that it should spur up an immediate endeavour to win it. That is the view of Mr. Napier; and he would have a differential charge for heating—1s. 6d. to 1s. 9d. according to quantity consumed—with a second meter (meter manufacturers should note his opinion that there is something better wanted in this way). He would also fix heating apparatus free, and give the consumers the opportunity of hiring, hire-purchase, or purchase outright at net cost. Now the differential price with additional meter seems a circuitous course for Mr. Napier to follow to gain his end. He has, we find (this accounts for the prices of gas in the town), a low capital per million cubic feet; and the charges for gas are low. Considering these favourable points, we should incline to the belief that his shortest cut to a commercial figure for heating purposes would be by a reduction of the illuminating quality of that unnecessarily high grade gas that he is still supplying. There must be considerable latent economy in this direction, recovering which would be of service not only in developing the heating business, but in giving a means of greater efficiency to the users of incandescent burners, cooking-stoves, industrial heating appliances, and gas-engines.

It is in the interests of economy, too, with the view to small gas undertakings rendering the maximum possible duty to the public, that Mr. Dickson wrote his paper on the "Checking of Working Costs in Small Gas-Works." But it is impossible to keep a day-by-day check on working costs without a systematic day-by-day record. Such a systematic record means a little additional trouble; but it pays. And in keeping such a record in small works, it is only the start that is a little irksome. Afterwards, when the work has got into proper swing, it becomes an easy matter. It is only by comparison of the working figures in each department day by day that one can put his finger on the places where there is a falling away from the best previously achieved. Knowledge of any retrograde movement enables the reason to be at once inquired into, and a check placed on the excess. There is in such system the secret of permanent working economy; and the means of ascertaining the directions in which to search and work for further savings. In small undertakings where the opportunities are not so great for development as in larger ones, it is quite as important as in the latter that the best method should be available for keeping a strict surveillance on the working, and that nothing should be left to chance. The paper is indicative of the many places in administration and working where there can be losses and gains, and therein Mr. Dickson's studious effort is valuable to the manager of the smaller undertakings. The application of system to the obtaining and maintaining of economy cannot fail to influence working costs; these in turn influence the prices charged for gas; and the lower the prices of gas, the greater the range of opportunities for business. The cycle of advantage is reproduced in the expansion of business; for business expansion brings beneficial influences to bear on working costs and standing charges. From all points of view, the author's method of advocating the checking of costs (which is only another way of saying checking waste) in small gas-works is admirable, and will carry weight, as there can be nothing but commendation of any system that promotes a clear survey and strict oversight of manufacturing operations.

Stand-By Clause Successes.

We are glad the Warrington Corporation succeeded in retaining in their Bill (*ante*, p. 274) stand-by clauses in the form secured by the Heywood Corporation in their Act in the session of 1909, despite the preference of the Home Secretary for the Mountain Ash model, which has been reproduced in the present session in the Rhondda District Council Bill. A clause, giving the right to levy a charge covering the expenses entailed in making stand-by provision for meeting the maximum possible demand, can now be had by gas suppliers from Parliament for the asking—Government Departments and Committees having been converted to a recognition of the right of gas suppliers to protection similar to that so freely accorded for years past to all electricity suppliers. The granting of such clauses again this session, without any objection to the principle, is the confirmation of the foregoing assertion. Although the Heywood and (now) Warrington clauses are a little more extensive than the Mountain Ash and Rhondda clause, we much prefer them, inasmuch as they include electricity as well as producer and suction gas, and define the limit of the standing charge that may be imposed, instead of—as in the Mountain Ash clause—leaving open to agreement or arbitration (which might result in endless disputes) the amount of the minimum annual sum to be paid. There is an uncertainty about this that there is not about the Heywood form of clause; and the manufacturer (in the absence of a specified limit) would no doubt more often than not think the gas suppliers were, in their demands, acting in an unreasonable, an arbitrary, and a retaliatory spirit. That is not a feeling the gas industry desire to do anything, even unintentionally, to foster; but they do want manufacturers to see and to understand that business considerations and equity give gas suppliers a right to recompense on money expended by them in safeguarding and assisting manufacturers. For the reasons stated, we prefer the Heywood clauses to the Mountain Ash form; and the Local Legislation Committee have, in the Warrington case, agreed, though the Home Secretary regards the Welsh precedent as more suitable for general adoption. Perhaps, however, on further consideration being given to the matter, he will be prepared to accept the Heywood version as providing full and sufficient protection for gas suppliers, and at the same time narrowing the scope for disagreement with the manufacturers.

Standard Burner Bills.

After repeated appearances of the notices in the parliamentary papers last week, the third reading of the Standard Burner Bills has been postponed to the Autumn Sittings of the House; and the formality is now entered for Nov. 15. This deferring of the completion of the course of the measures is to be regretted; but the customs of Parliament and the opportunities for opponents to indulge in procrastination have to be borne, however much they may be disliked, by those concerned. But this fact need not be allowed to stand in the way of early preparations being made for a further promotion next session. Eleventh-hour obstruction, by irritated local authorities and business competitors, cannot deprive the gas industry of the triumphant successes of the Bills up to this point, and the unanimous verdicts of Committees of both Houses of Parliament.

South Metropolitan Accounts.

Through going to press earlier owing to the claims of Bank Holiday, we are unable to editorially notice in this issue with usual fulness the half-yearly report and accounts of the South Metropolitan Gas Company; but we publish them elsewhere, and will revert to them next week. Meanwhile, we may say that the proprietors will have the opportunity to again heartily congratulate the "co-partners," from the Chairman (Mr. Charles Carpenter) throughout the ranks of officials, staff, and workers, on the financial and manufacturing results of the half year. The profits will admit of the full statutory dividend of £5 9s. 4d. per cent. being paid. In the class of 4 per cent. consolidated ordinary gas stocks, this dividend, we should think, stands at about the head, if not at the very head. Regarding the financial result, the price of gas is 1d. lower than it was in the corresponding half of last year; and the dividend is 2s. 8d. per cent. higher. Nevertheless, the Company will be carrying forward a surplus of £12,932 from the profits of the half year, which is practically the same amount as the surplus yielded by the profits in the preceding half year. The result is that, the accumulated surplus of profit brought into the half year being £79,627, there will be carried out a surplus of £92,559. We should have to go back many years to find the equal of this. But with excellent reserves in their possession, the Company have never pursued the policy of holding large undivided balances, but have always, at the earliest opportunity, having regard to prospects, given the greater part of the surpluses to the consumers. The report and accounts show that the continued improvement in the financial position has largely to be credited to the carbonization department.

Lethal Qualities.

What was termed a "mystery" in June, but did not seem to us deserving of the description with the known facts at the time, has now been definitely cleared up. This was the Long Acre poisoning case, which the newspapers led the public to think

until corrected, was due to escaping coal gas. Several families were placed in a more or less precarious condition, eleven persons had to be removed to hospital, and they suffered considerably. With as little fuss as possible, the Charing Cross (West End and City) Electricity Supply Company lifted no less than 150 feet of fused cable from the roadway, and replaced it by new. This change was referred to in the "JOURNAL" for June 14 (p. 679). The bitumen of the fused cable was found in a molten condition, and giving off fumes, which the evidence assured could be seen, smelled, and tasted. This was the "gas" that did the mischief by percolating through the ground, and finding entry into the neighbouring houses. It was fortunate for the persons affected that the danger they were in was discovered so early. A canary succumbed; and *post mortem* examination of the bird satisfied Dr. Mott of the Charing Cross Hospital that the symptoms were those of carbon monoxide poisoning. During the beating of the big drum by "Metalite Limited," before issuing their prospectus, when speakers and lay representatives of the Press were under the influences of a generous lunch provided at the expense of the Company promoters, something was said as to the lethal qualities of coal gas! The report to the Holborn Borough Council on the Long Acre affair had not then been issued. The Council are sensible of the seriousness of the danger of cable-fusing, and are urging the Local Government Board to take such action as may be necessary to prevent a recurrence of similar mischief. The Board will be pleased.

Commencing Loan Repayments.

When the Bill of the Fylde Water Board was before the Chairman of Committees of the House of Lords a few days since, there was some discussion as to the period at which loan repayments for new works should commence. The Board were desirous of not being under any obligation to begin the repayment until the conclusion of the construction of the works, or alternatively at a period of seven years from the passing of the Act. Purchase of lands, construction of a covered service reservoir, a water-tower, an equilibrium basin, and road diversion are likely, according to estimate, to cost £140,000; and aqueducts, high-level mains, and extension of existing mains, an additional £12,000. The works are required for the supply of Blackpool, Fleetwood, Lytham, St. Annes-on-the-Sea, and other Lancashire places. Under the most favourable circumstances, with the period for repayment postponed, it is anticipated there will be a deficit in revenue, starting from 1913, which will in following years require a rate-in-aid of 2d. in the pound from the four urban districts served. The Board did not get all they wanted in regard to the matter of deferring repayments—the Lord Chairman considering that if they were granted five years from the passing of the Act as the date for commencing repayment, the circumstances of the case would be fully met.

The Burden of the Rates.

The agitation on the subject of the burden of local rates, which was referred to in last week's issue, appears to be spreading; for a conference convened by the Leeds Corporation has now been held, at which practically all the county and municipal authorities of Yorkshire were represented—showing, as the Chairman (Alderman C. H. Wilson) remarked, that the whole county had risen against an intolerable state of affairs. The object was similar to that of the Preston gathering—to protest against the manner in which the Legislature has placed upon county and borough councils the responsibility for services wholly or largely national, without increasing the contributions made towards the cost from the Imperial Exchequer. In proof of the way in which the burden of local rates really has increased, the Chairman quoted from a memorandum on the subject prepared for the Association of Municipal Corporations. In this it was pointed out that, during the period of twenty-two years from 1867-8 to 1889-90, the amounts of rates raised increased by only 5d. per pound of valuation, and 4s. 3d. per head of population; whereas in the period from 1889-90 to 1905-6—which represented sixteen years only—the increase amounted to 2s. 5d. per pound of valuation, and 14s. 7d. per head of population. Five causes, he said, were set down as being the reasons of this increase; and the one of which they chiefly complained was the imposition of new duties on local authorities, without corresponding contribution towards the cost of them from the Imperial funds. The need here shown for revising the present system, was also pressing in regard to education. Towards the latter service, the Government at one time contributed something like 75 per cent. of the cost, while now they contributed hardly 45 per cent.; and the difference had to be made up by the local authorities. As the outcome of an interesting discussion, the resolution which found favour was in the following terms: "That, having regard to the fact that the expenditure by local authorities upon education and other services wholly or partially national in character has in recent years increased out of all proportion to the contributions from the Imperial Exchequer, and that, notwithstanding this inequality, the Legislature is annually imposing further duties upon local authorities involving additional charges towards which no provision is made for adequate grants in aid, this conference is of opinion that it is imperatively necessary that the financial relations between the Imperial Exchequer and local authorities should be revised at the earliest possible date, and that in the meantime provision should be made for a substantial measure of relief in the Finance Bill now passing through Parliament."

A Question of Procedure.

The affairs of the North Bromsgrove Urban District Council have lately had shed upon them a somewhat stronger light of publicity than that to which they are perhaps usually accustomed. The cause of this has been a dispute which in due course found its way into the Law Courts. The facts were fairly simple, and though doubtless a little outside the ordinary course of events, they, together with the outcome, may merit brief notice. From the statement of the case which appeared in "The Times" law reports, it appears that all the members of the Council went out of office in April last, in pursuance of an order of the Worcestershire County Council, made under a section of the Local Government Act of 1894. A new Council were elected, and held their first meeting four days after the dissolution had taken place. The twelve members of the Council, on the occasion of this meeting, were equally divided, and it was found impossible to agree on a Chairman. However, one of the newly-elected members, a Mr James, who was the Chairman of the previous Council, offered to preside over the meeting, so that a Chairman could be appointed for the ensuing year. One member objected to this course; but the Clerk advised that it would be legal, if Mr. James was not himself a candidate for the chairmanship. Accordingly, Mr. James acted and when the voting was equal, he gave a casting-vote in favour of one of the candidates. Thereupon objection was taken that, under the circumstances, the appointment could not stand. The point of law which came on for argument was whether Mr. James was entitled to take the chair at the meeting, and as Chairman to give a casting-vote. The judgment of the King's Bench Division was to the effect that Mr. James had no power to act as he did. The Lord Chief Justice said that the question raised was one of considerable difficulty. As all the members of the old Council went out of office, there was *primâ facie* no right for anyone to enter the room except those who had been elected to the new Council. It had been urged that Mr. James had a right to preside at the meeting, as he had been Chairman of the Council for the previous year; but the inherent or implied rights to act as Chairman depended on membership of the Council, and if Mr. James had not been elected a member of the new Council he would have had no right in the room, unless he had been a Chairman elected from outside, under the Local Government Act of 1894. While admitting that it was unfortunate that there was no statutory provision, in the case of District Councils, continuing the Chairman in office until his successor was appointed, his Lordship pointed out that all the powers of the old members ceased when they went out of office in April; and the first act of the new Council should have been to elect a Chairman of the meeting.

The German Association Visit to England.

The Secretary of the Institution of Gas Engineers (Mr. W. T. Dunn) sends the following information: The visit of the German Association of Gas and Water Engineers to Great Britain, which was postponed on account of the death of King Edward, has now been arranged to take place during the week commencing the 2nd of October next. The visitors are to be the guests of the Institution of Gas Engineers, the Gaslight and Coke Company, the South Metropolitan Gas Company, the Croydon Gas Company, and the Corporations of Edinburgh and Glasgow respectively, of which latter city the Engineer of the Gas Department (Mr. Alex. Wilson, M.Inst.C.E.) is now the President of the Institution of Gas Engineers.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 354.)

THE Stock Exchange has had a short but a somewhat exciting week; showing how sensitive markets are, and how quickly and unpreparedly they can undergo an almost revolutionary change. The opening day was very dull all round, depressed by the liquidation which marked the latter part of the previous week and which now continued. The American and South African Markets were the chief sufferers; but others shared. Gilt-edged securities were lower, and Consols fell ¼. Rails were weak, and nervousness about further strike troubles made them worse. Dividend announcements, too, were not quite satisfactory. Foreign were weak on Continental selling. Tuesday was the beginning of the settlement—an anxious affair, having regard to the prevalent weakness. Prices in general shrank under liquidation; and there was much depression in speculative lines. On Wednesday came the extraordinary change. The American Market then turned completely round, and was buoyant and cheerful. The Continental selling suddenly ceased, and buying was the order. All departments felt relief from the strain. Consols advanced, and, with some good dividend announcements, Rails had a smart rise. On Thursday, the joyful recovery was well maintained, and prices in most lines continued to advance. With only one more day—the Exchange was closed on Saturday—business became very quiet on Friday. But the week closed well with undiminished strength, and satisfaction that the settlement had gone through so much better than was expected. In the Money Market there was extreme ease. The supply continued abundant, and discount rates relaxed. Business in the Gas Market was moderate—about a fair average for the season. Everything was very firm, and a few quotations advanced. Accounts for the half year to hand up to date should be satisfactory to shareholders, especially where increased dividends are announced. In Gaslight and Coke issues, the ordinary was very firm at from 105½ to 106¼, the half-year's accounts showing out well. In the secured issues, the maximum made from 89¾ to 90⅜, the preference from 104 to 105, and the debenture 80½ and 81. South Metropolitan was quiet and firm at from 122 to 122⅞. The debenture made 80¼. In Commercials, the 4 per cent. changed hands at 108½ free. Among the Suburban and Provincial group, Alliance debenture was done at 97, Brentford "old" at 253, and Tottenham "B" at 115—a rise of 1; but the "A" stock rose 6. Both the Tottenham and the Wandsworth Companies announced increased statutory dividends. In the Continental Companies, Imperial was steady at from 179½ to 180½, ditto debenture realized 94, and European fully-paid 24. But Union changed hands at 91 and 91½—a fall of 2½. Among the undertakings of the remoter world, Monte Video was marked at 12 $\frac{9}{16}$, Primitiva at from 7¼ to 7 $\frac{7}{16}$, ditto preference at from 5¼ to 5 $\frac{7}{16}$, ditto debenture at 97½, and San Paulo at 16⅛.

ELECTRICITY SUPPLY MEMORANDA.

Microscopic Profits and the Assessment of Undertakings—Horrible Sufferings and Holocausts—The "Safety" of Electricity—Life of Metallic Filaments—A "Special" on Outdoor Lighting—Relation of Current Saving and Candle Power Diminution.

NOTICE was recently taken in the "Memoranda" of the deficits and narrow profits of several municipal electricity undertakings during the last financial year. The Bermondsey concern is one in whose fortunes all gas men should be interested, because this is the one in connection with which the Bermondsey clause—the forerunner of the Northumberland clause—had its origin. This piece of municipal speculation on the part of Bermondsey has not had a happy result. There have been big deficits, and no provision of proper financial reserve; and the concern has been favoured by being under-assessed. Last financial year, a "surplus" of £43 was made; and the Finance Committee are anxious as to the future. Over surpluses, however small, upon electrical undertakings, there is, on account of their rarity, great rejoicing in some municipal circles. But small surpluses are dangerous—a little change in condition in the next year may turn them into losses. The price of coal, for instance, has only to go up a few pence per ton to make a considerable difference in the ultimate financial result. The Bermondsey Borough Council Finance Committee recognize this. They consider the prices being charged for current altogether too low, and adjure the Council to be careful as to how the undertaking is worked in the future, more especially with regard to incurring further liability by way of loan. The undertaking is likely, too, to have to pay more in rates in future. It is not the only municipal concern of the kind in the country that is under-assessed. The present assessment is £2693 gross, and rateable £1796; while under the quinquennial valuation the figures have respectively been raised to £3399 gross, and £2266 rateable. The London County Council are objecting to the quinquennial valuation—not on account of its increase, but because it has not gone high enough. They claim a correction to gross value £8000, and rateable value £3000. The Borough Council do not like this. But there has been too much favouring of municipal electricity undertakings in the past in the matters of assessments and rates; and it is high time that they, like gas and other businesses, paid their fair proportion towards governmental expense. The unfortunate thing is that good conduct in this respect may mean a bad presentation as to surplus profit when the annual accounts are next issued.

The "Electrical Review" is never so good at nerve-racking as when dealing with the lighting of trains by incandescent gas-burners. It has always been so; and a sort of morbid love of the thing seems to have taken permanent possession of it. It has just returned to the charge; and speaks of "horrible sufferings," of persons being "burnt to death" in sight of their friends, and of "terrible holocausts" in the event of accidents when a few cylinders of compressed gas are carried underneath trains for lighting purposes. Our contemporary has, of course, never heard of all these things happening in connection with trains that are not gas-lighted. While it is in the frame of mind, we should like it to quote the "many instances on record" in this country in which there have been these "horrible sufferings" and "terrible holocausts" due to the cause to which, through blind electrical bias, it chooses to assign them. Electricity is an illuminant that is, in the eyes of the ill-informed "Review," free from the dangers of gas. On the very day that the paper was treating its readers to the above-quoted examples of its fulminatory power, the eye happened to alight on a message from Paris, published in the daily press, which stated that "the inquiry into the loss of the *Pluviose* appears to have established beyond doubt that a fire occurred on board shortly before the collision owing to an electrical short-circuit, and that all on board were asphyxiated, not drowned." We will not enlarge upon the "horrible sufferings" of the men on board. There is recollection, too, of a "terrible holocaust" about last Christmas time at Clapham that the "illuminant that is free from the dangers of gas" was adjudged to have occasioned. Information was published last week, too, as to the Long Acre "mystery," reference to which is made in an earlier column. On Wednesday a fire occurred at the Earl of Portsmouth's residence in Mansfield Street, the origin of which was distinctly traced to electric wire fusing. We at one time thought the "Review" had arrived at years of discretion. Perhaps it has, and has left them behind.

While editorially our electrical contemporary does not recognize any danger from electricity, one of its correspondents does, for he writes: "For every accident of a less serious nature which is reported to the Board of Trade, and included in the statistics issued by the Home Office Inspector, it is safe to say that there are many which are not so reported, either because they occur on private premises, or because they are of such common occurrence as to be disregarded. This applies with full force to accidents in connection with fuses, which result in the attendant sustaining burns or shock of greater or less severity. The damage to apparatus, switchboards, buildings, &c., occasioned directly or indirectly by ineffective fuses, remains for the most part unrecorded, and often undiscovered at the time, or is attributed to another cause." In a later column, there is a quotation from the "Electrical World," which states that a fire recently occurred in a show window of a store in Chicago. A 40-watt tungsten lamp was hanging in the window in the ordinary vertical position, and attached to a standard fixture in the usual manner. Ten feet below it, on the floor of the window, was a mass of ladies' dress goods. In some manner the socket of the lamp suddenly broke, perhaps due to a short-circuit. The bulb fell on the textile fabric beneath, and set it on fire. The contents of the window were burned or badly damaged. The wiring leading to the lamp, when afterwards examined, was found to be quite right, and there was a 6-ampere fuse in the circuit. "It is rather remarkable that the bulb could drop 10 feet through the air, and still retain enough heat to set fire to the cloth beneath." The exact cause of the supposed "short" in the socket is unknown. There is nothing so safe as electricity—within the pages of electrical papers and central station advertising literature.

Advances are being made in respect of human longevity. Hardly a day passes now without one reads about some individual who has scored a century in age, and is still in possession of his or her full faculties. But in this matter of longevity, the human race must bow to the metallic filament lamp. When these lamps first came on the scene, a few hundred hours' life was spoken of; then it got to 1000 hours; and there has been progressive tendency in this way, until in the Metalite Company's prospectus the other day there was talk of a London Electricity Company having had thirteen lamps running 2226 hours, and of these on June 17 four were still burning efficiently. Why was not a statement made as to whether any of the four were still running a few days before the issue of the prospectus on July 24 and 25? But the Metalite Company must step aside to allow a superior lamp to take precedence. Mr. Byng, the Chairman of the General Electric Company, Limited, the makers of the Osram lamp, told the shareholders the other day the old, old "story" of how that wonderful invention had reduced the cost of electric lighting to less than that of gas, and then went on to say thousands—not paltry hundreds or dozens, but thousands—of Osram lamps were in use to-day that had burned over 6000 hours. How users of electric lighting wish they could confirm these thousands of hours' use as average figures applying to daily practical conditions. But they know, and those who quote the tall figures know, that they cannot. But after saying this, we are doubtful as to whether our electrical friends will believe us when we state that we have still in use some of the first bijou inverted burners made by the New Inverted Company years ago, and they have only very occasionally required the renewal of a mantle—not complete replacement of the whole burner, which burner cost initially less than the Osram, Metalit

or any other metallic filament lamp, the whole of which has to be renewed when its work is done.

The staff of the "Electrical Times" will no doubt be gratified to think that we remember their special effort last year in bringing out a special domestic electrification number. According to that issue, the electrical industry was then equipped with all that was required in appliances and in low costs for current to oust gas from every field that it occupies. We recollect the issue, electrical engineers also remember it, as a splendid example of bluster and misrepresentation. We had the courage at the time to properly describe the issue; electrical engineers received their copies, smiled bland and copious smiles, and said nothing except *sub rosâ* among themselves. They were advised then by the "electrification number" to go up into Mount Pisgah, and view the land flowing with milk and honey. As we pointed out at the time, it was from Mount Pisgah that "Meteor"—or was it Moses?—took his first and last view of the Land of Promise; and the suggestion was also made in the "Memoranda," that the writer who advised a trip up Mount Pisgah should read an account of the modern conditions of the Promised Land. Nearly a year has sped its course; and domestic electrification has not made much progress in the land flowing with milk and honey—flowing with milk and honey though, it is calculated, 90 per cent. of the lighting business is in the hands of the gas industry, and a matchless trade (apart from solid fuel) is being done by it in the cooking, heating, and industrial lines. Now the "Electrical Times" is canvassing for material for another big issue, to see the light of day during the autumn. This time the "special" is to be devoted to outdoor lighting—street, frontage, sign, &c. The intimating circular is highly interesting, and prepares us for what we are to expect. In it we read—

Thanks to the modern arc and wire lamps, we have a stronger case against gas than ever before; and we desire, in our special issue, to collect all the available "powder and shot" for a campaign to capture more of the outdoor lighting in this country. We hope to present a valuable body of information and arguments that will help station engineers to secure more business in the immense and profitable field of external lighting. We intend to give particular prominence to street lighting, in order to supply a counterblast to the isolated and widely advertised "victories" of gas in Regent Street and elsewhere. With this object we shall be grateful if you will fill up and return the enclosed form. If there are any points that you would specially like to see dealt with, kindly let us know. We welcome suggestions, and shall doubly welcome any further information you may be able to send us. Thanking you in advance for your courteous assistance.

There are a good many "we's" in the communication. The term "isolated" is quite good as applied to the plurality suggested by "victories" in Regent Street and "elsewhere." The "Electrical Times" welcomes suggestions. We suggest the publication of the report on public lighting of the City deputation *in extenso*, the reports of recent discussions on public lighting in the Westminster City Council, information as to the contracts entered into at Bethnal Green and Hackney, also as to the latest London success at Finsbury. Particulars as to the action taken, after the Gaslight and Coke Company's tendered figures have been published, in submitting revised or new prices for electricity. If there is room in the special outdoor issue, the Editor might also for guidance indicate in some way whether or not, where there have been electrical "victories" in street lighting, the electricity supply undertakings are controlled by the local authorities; the price at which current is supplied for the purpose; and works' costs and capital and other charges per unit of electricity sold. These are a few suggestions; and we accept "in advance" the thanks of the Editor of our contemporary for our "courteous assistance." There need be no further acknowledgment.

We are told that this is an age of electrical novelty-mongering; and that from the novelties which are opposed to simplicity, to cheapness, and to efficiency, a great deal of harm is likely to arise to the electricity industry. "Meteor" of the "Electrical Times" feels very sore over the subject; and he has our profound sympathy, because we recognize fully that the difficulties of the electrical industry in pushing out their borders in the domestic electrification field are so great that it does not want these difficulties increased from within. There are regulating switches, resistances, &c., in connection with which, in the endeavour to satisfy that terrible craving in the electrical industry for profits, statements are made that are prejudicial to the cause of electric lighting in general, inasmuch as the statements are utterly fallacious. We are on quite good terms with "Meteor" in this matter, because there are several things that have lately been said in the electrical industry that are "utterly fallacious." But the matters of which "Meteor" complains all arise from the "glare" of the metallic filament lamp, to reduce which "the well-meaning young men who push such apparatus" advocate the use of regulating switches and similar devices. "The Times" has had a paragraph on the subject, in which the chief harm lies in making what appears to be a general claim that "electric lamps may be lighted brilliantly or otherwise as may be desired." "Meteor" waxes in wrath. "To use metal filaments thus would obviously wipe out their advantage over carbon filaments, and impede progress wherever such methods were adopted. The candle power falls much more rapidly than the current; and, to correct yet another fallacy, even a 12½ per cent. 'saving' in current involves far more than 12½ per cent. 'saved' in candle power. It means, for instance, that a 50-candle power lamp would merely be giving something like 30-candle power if of tungsten, and less if of certain other metals."

THE GASLIGHT AND COKE COMPANY.

THE following is the report on the working of the Company during the six months ending June 30, which, with the accounts (an abstract of which appears on p. 343), will be submitted to the proprietors on Friday.

The accounts for the past half year show that, after providing for fixed charges, setting aside £10,000 towards the redemption fund (in accordance with the provisions of the Company's Act of 1903), and contributing £10,000 to the reserve fund for the purpose of writing-down the investment, and £20,000 to the insurance fund, there remains a balance of £430,150 13s. 9d. The amount brought forward from the West Ham Company and this Company for the previous half year being £489,739 17s. 9d., there is a total sum available for distribution of £919,890 11s. 6d., out of which the Directors recommend a dividend on the ordinary stock at the rate of £4 13s. 4d. per cent. per annum, which will absorb £377,520 7s. 8d., and leave the sum of £542,370 3s. 10d. to be carried forward to the credit of the current half year.

This is the first half year in which the accounts include the West Ham Gas Company, the amalgamation of which with the Gaslight and Coke Company duly took effect on the 1st of January last.

The sales of gas for the half year show an increase of 1¾ per cent. compared with the quantity sold during the corresponding period of 1909.

There has been an increase during the six months of 12,835 consumers, and of 20,057 in the number of gas-stoves sold and let on hire.

The Directors have to report that they have entered into coal contracts at somewhat higher prices than last year. But they are pleased to add that the residual market shows improvement; and this should materially help to meet the increased cost of coal. Contracts for oil have been made at satisfactory prices.

The Court of Directors has been furnished by the several Engineers of the Manufacturing and Distributing Departments respectively with the usual certificates that all the Company's plant has been maintained in thorough efficiency.

CORBET WOODALL, Governor.

Horseferry Road, S.W., July 19, 1910.

SOUTH METROPOLITAN GAS COMPANY.

THE following is the report of the Directors of the Company for the six months ended the 30th of June, which, with the accounts [see p. 344], will be presented to the proprietors at the ordinary half-yearly meeting on the 10th inst.

The profit of the half-year's working provides for payment of the sliding-scale dividend at the same rate as before—viz., £5 9s. 4d. per cent. per annum—and leaves an increase in the surplus of £12,932 to carry forward. This result may be considered satisfactory, when it is borne in mind that gas is 1d. per 1000 cubic feet cheaper than it was a year ago. This reduction means £52,000 a year to users of gas in the Company's area.

Unfortunately, however, coal is costing more under the new contracts, apparently from no other cause than the disturbing effect of the Coal Mines Regulation (Eight Hours) Act. The proportion of the increase in cost which must come out of the pockets of the Company's consumers is about £40,000 per annum. The Act has been productive of great dissatisfaction in Northumberland and Durham, from which district the requirements of the Metropolis are mainly obtained.

The Port of London Bill, when it passes, will entail another hardship on the users of gas produced from seaborne coal. By the Bill, the rate to be levied (which may amount in this Company's case to £10,000 a year) will be applied mainly to the increase of dock accommodation, which will be of no benefit to the Company. Your Directors strenuously urged the unfairness of taxing to this extent a necessity such as coal; but they regret to say their endeavours met with no success.

It is more pleasing to turn to the manufacturing results, in which continued improvement has to be reported. The quantity of gas sold per ton of coal has now risen to 11,543 cubic feet; consequently a slightly increased demand for gas has been met concurrently with a reduction in the coal carbonized at the rate of over 50,000 tons per annum. The receipts from breeze and tar remain the same; those from coke are rather lower; while there is a distinct improvement in the item of ammonia. On the other hand, the cost of works repairs has considerably increased, mainly by reason of heavy renewals of coal-handling machinery at the Rotherhithe and East Greenwich works. Part of this outlay has already been justified by the reduced cost of carbonizing wages. Most items of "distribution" charges are heavier; but the money has been well spent in providing for the ever-extending requirements of the consumer.

The co-partnership continues its useful course, and much of the success with which the Company has been able to meet the obligations of increasingly competitive times is undoubtedly due to the loyal devotion given by the officers and workmen of its staff.

CHARLES CARPENTER, Chairman.

709, *Old Kent Road, S.E., July 27, 1910.*

PERSONAL.

Mr. HENRY BUTTERFIELD, who for the past 6½ years has been Gas Engineer and Manager to the Silsden Urban District Council, has obtained the appointment of Manager of the Swadlincote Gas-Works, in succession to Mr. G. B. Smedley, for which applications were invited in the "JOURNAL" a few weeks ago.

Mr. JOHN M. SMITH, Joint Manager with Mr. S. Dickie of the gas-works of the Dumfries Corporation, has been appointed Engineer and Manager of the Stirling Gas Company, in succession to his brother, who, as readers are aware, is moving to Belfast. Mr. John Smith obtained his position at Dumfries on the death of Mr. George Malam about four years ago.

In the "JOURNAL" for the 21st of June, we announced the death of Mr. Benjamin Haynes, the Secretary of the Stretford Gas Company; and in the issue for the 12th ult. an advertisement appeared inviting applications for the appointment. There were upwards of 600 responses; and they were first reduced to 100, and finally to seven. The vacancy has now been filled; the successful applicant being Mr. WILLIAM BLUNDELL, of the Gas Department of the Stockport Corporation, and formerly engaged in the Southport Gas Department. In connection with this appointment, it may be mentioned that Mr. H. KENDRICK, who was originally Engineer of the Company, is now Engineer and Manager.

Mr. F. L. WIMHURST, youngest son of Mr. Henry Wimhurst, of Sleaford, has been appointed by the Newcastle-under-Lyme Corporation General Manager to their gas undertaking. There were about 200 applicants for the position, and these were reduced to six, who attended before the Gas Committee on the 19th ult., with the result stated. The successful applicant served his articles with Messrs. R. & J. Dempster; and he was placed on their engineering staff. He was subsequently appointed Assistant to Mr. J. H. Troughton, the Manager and Secretary of the Newmarket Gas Company; but he has been for nearly eight years Assistant Engineer and Works Manager of the Cambridge Gas Company, under Mr. J. W. Auchterlonie. He will take up his duties at Newcastle (Staffs.) on the 1st prox.

Prize Winners in the City and Guilds Examinations.

In recent issues of the "JOURNAL," lists have been given of the candidates who passed the last examinations in "Gas Engineering" and "Gas Supply" in the Department of Technology at the City and Guilds of London Institute. We have now received from the Superintendent of the Department (Sir Philip Magnus, M.P.) a list of the prize winners in the subjects named, as well as in that of "Coal Tar Distillation and Products;" and the following are their names, and the centres at which they studied:—

Gas Engineering.

Honours Grade—First prize (£3 and a silver medal), Ernest Myers, Technical Department of the Sheffield University.

Ordinary Grade—First prize (£2 and a bronze medal), Roland A. Weston, Norwich Technical Institute; second prize (£1 10s. and a bronze medal), John William Dixon, Manchester Municipal School of Technology; third prize (a bronze medal), Rudolph H. Duxbury, Manchester Municipal School of Technology.

Gas Supply.

Honours Grade—First prize (£3 and a silver medal), Francis Charles Briggs, Westminster Technical Institute of the London County Council.

Ordinary Grade—First prize (£2 and a bronze medal), Stanley Barker Johnson, Hull Municipal Technical College; second prize (£1 10s. and a bronze medal), Francis Joseph Kennedy, Manchester Municipal School of Technology; third prize (a bronze medal), Robert Robertson, Bath Technical School.

Coal Tar Distillation and Products.

Honours Grade—First prize (£2 and a silver medal), Morris Fort, Huddersfield Technical College.

Ordinary Grade—First prize (£1 10s. and a bronze medal), Cecil Ramsden Smith, Leeds University; second prize (a bronze medal), Thomas Horner, Manchester Municipal School of Technology; third prize (a bronze medal), Sydney John Plaice, East Ham Technical College.

The money prizes in "Gas Engineering" and "Gas Supply" are given by the Goldsmiths' Company, those in "Coal Tar Distillation and Products" by the Salters' Company.

The late Mr. Alfred Colson, of Leicester, whose death on the 27th of May was noticed in the "JOURNAL" the following Tuesday, left estate valued at £23,219 gross, with net personalty of £18,353.

A memorial to the late Dr. George F. Deacon, M.Inst.C.E., in the form of a west window, erected by his widow and children, was dedicated at the church at Vyrnwy last Tuesday. The church stands at the head of the lake, the construction of which was initiated and carried out by him as part of the great scheme lately completed for the water supply of Liverpool.

THE AMERICAN GAS INSTITUTE:

REVIEW OF ITS HISTORY AND WORK.

[COMMUNICATED BY AN ENGINEER IN THE STATES.]

THE Institute is now nearly four years old, since its formation occurred on July 10, 1906. Time enough has elapsed, therefore, to warrant a survey of what it has accomplished. This may profitably consist in a consideration, first, of what organization has been developed for the service of the industry, and, second, what service has actually been rendered.

Everyone is familiar with the steps leading to its birth, and also probably with the reasons that impelled the merging Associations to lose their identity. These reasons, or rather the objects in view, as stated in section 2 of the Constitution, will, however, be repeated now in order to compare the actual progress of the Institute during the past three years with the future planned and hoped for.

The first object was amalgamation. This, of course, is now an accomplished fact.

The second object was to facilitate co-operation between the Institute and all District Gas Associations. This affiliation has been at least nominally secured from the Illinois, Iowa, and Wisconsin Associations; and it is quite probable that most of the other District Associations will also affiliate. Therefore, superficially, affiliation may be considered as being successful. When, however, its practical benefits to the industry are looked for, the truth seems to be that, except for a feeling of oneness with the Institute that probably accompanies (in the District Associations) the election of an affiliated director, nothing has been gained. The expectation of the Institute formers was that each District Association would be so eager to become affiliated with the Institute as to be quite willing to comply with the accompanying conditions in regard to original work. The facts are that Michigan, the one District Association which has for years been supporting original investigation, has refused to affiliate—principally because it wanted to be supreme in its own investigations. This is a quite natural feeling; but the Michigan men themselves would admit that, with the experience that the Institute has at its command, the Michigan investigations could be increased in value. The other Associations which are planning to begin, or have already begun, original work, are a little touchy on the subject of taking orders from the Institute about such work. The Institute itself, as will be seen later, is not organized to lay out a broad field of work to be divided among the District Associations. The net result of all this is that, after three years, affiliation has produced nothing in the shape of original work, except some experiments by the Illinois Gas Association on pumping gas; and their results were not offered to the American Institute, as not being entirely satisfactory.

The third object was "to secure a more rapid promotion and advancement of scientific and practical knowledge in all matters relating to the construction and management of gas-works and the manufacture, distribution, and consumption of gas." In the minds of the "Committee on Proposed Sections," which quoted these objects in their report to the Institute at its first meeting, this third object could best be secured by a division of the Institute into sections—in other words, by a specialization of the work. The report was unanimously adopted; but four years have passed, and as yet no sections have been formed. The natural result is that, as far as meeting programmes go, the Institute has differed little from any of its predecessors; and each year a large number of its members—especially those interested in accounting or new business matters—have found comparatively few papers of interest to them. It is not strange, therefore, that the record of the Institute's accomplishment, as a body, shows little progress in any sphere save that of engineering.

In default of sections, the Institute is simply a repetition of the American Gaslight Association on a scale twice as large, with one important exception to be now noted. The American Association, in its time, produced much good Association work, for which credit was due largely to its Research Committee. The Technical Committee was created to perform a similar service for the Institute; and in its short life of three years, it has well justified its existence, as will be shown in discussing later the accomplishments of the Institute. A great weakness, however, in the Technical Committee—as in the Institute in general, and as past history shows in most Associations, gas or anything else—is due to the fact that one man, or at most a few men, are expected to do, and practically forced to do, the whole work of a year. In the old days, the President and Secretary spent each year most of their time urging members to write papers. By the formation of the Technical Committee, with the provision of Sub-Committees drawn from the general membership of the Institute, it was hoped that the services of a large proportion of the members could be enlisted, and in this way much progress made without undue burdening of any one person. Membership of the Technical Committee, so it was thought, should seem attractive enough to the ambitious among the gas men to provide a yearly crop of willing workers, especially if there was a re-election of the most deserving, and a final reward of good work in the shape of election to the presidency and vice-presidencies. Actually, as far as getting papers is concerned, the formation of the Technical Committee has meant the transference of the worry of such solicitation

from the President and Secretary to the Chairman of the Technical Committee.

In theory, every member is willing to do his share of the work. In practice, the work is done by a very few men, and by these same men year after year. Consequently, the progress of the Institute, and therefore of the gas industry, lags behind the advance possible if every one would do his fair share. Personally, I believe that not until sections are organized will the Institute present the best means for attracting to itself the ability and the services of each individual member; and in the opinion of the writer, the Institute owes an apology to its members for not having yet offered to them a form of sectional organization for their approval or disapproval. This, however, does not excuse the membership from their general unwillingness to do work and offer the results of it.

So much for the present organization of the Institute. Now as to what it has done for its members and the interests of the gas industry. It issues, in convenient form, well indexed abstracts of all articles of interest in the leading technical journals. This very valuable service has, however, involved nothing on the part of the Institute but proof-reading, as the work of abstracting has been done gratis by the United Gas Improvement Company.

In the line of what might be called committee work, as distinguished from papers contributed by individuals, the prestige of the Institute, and the knowledge of its members on the "Committee on Uniform Systems of Accounting" was of the greatest value to the gas companies of New York State in influencing the compulsory system of accounts promulgated by the two Public Service Commissions. Had the accounts been approved as originally drafted by the Commissions, useless expense and confusion to companies and the public alike would have resulted. Also, if there had been no Institute with the right to speak for the entire gas industry, the representations of the Committee would have had much less weight with the Commissions.

Fully equal in importance are the results obtained by the "Committee on Calorimetry," as embodied in their report containing complete working data on all commercial calorimeters, and in the effect of their influence and advice on the Wisconsin Railroad Commission's rules for gas testing and standards.

The "Committee on Units of Light" has, in conjunction with other Associations, done yeoman work in furthering the establishment of an international standard of light. This has required much painstaking labour, and ability of a high order.

The "Committee on Uniform Methods of Taking Candle Power" has also made freely available valuable information upon general photometric work, representing the fruits of years of experience, of a kind not at all possible to the average Institute member.

The "Committee on Electrolysis" have in their various reports made available to each Institute member, in convenient form, a complete treatise on the theory and effects in different countries of electrolytic corrosion. The information contained in these reports summarizes the opinions of the experts on this subject; and thus is freely given advice far more valuable than is true of much for which big fees have been paid.

The "Bureau of Information" has also rendered valuable aid for three years to members in need of all sorts of help; and the answers thus sent out, form—with the revision of the "Question Box" and the "Practical Class" answers—the best available material for the student in gas matters. In the revision of the "Question Box," on questions relating to both manufacture and distribution, the Institute has placed in compact and easily obtainable form whatever there was of value on these subjects in the "Question Box."

Coming under the head of papers, the Institute has shown how uniform candle power can be secured with the minimum of expense, and has in "Dipping Meters" made the most important contribution in the history of the dry meter towards prolonging its life and period of correct registration, and decreasing the cost of meter maintenance. No other papers can be considered as being on a par with the two above described, or as rising above the usual level of an Association paper in which work of some nature is described, and from which, here and there, knowledge helping to build up the industry is obtained.

Anyone who knows the men who have been engaged in the above-mentioned work for the Institute, and whose knowledge of the gas industry is sufficient to enable him to appreciate the character of the work done, need not be told on how much higher a plane it is than were the papers or reports of the merging Associations. Because the Institute has unnecessarily confined its work too much to the technical side—neglecting the very important commercial and new business fields, and for this very reason made its meetings uninteresting to a large number of members, whose education and occupation unfitted them to appreciate engineering topics—a certain feeling has arisen that the Institute has failed to justify its existence. This feeling is, of course, entirely wrong; and probably most of the men who share it do not now use to anything like a full extent the opportunities that are offered to each member. The "Bureau of Information" alone will, by wise advice, save many times over the yearly dues. The abstracts available on payment of an extra $5 are worth many times the sum. No gas engineer can find fault with the Institute on the score of it not returning good value for his money.

The record of Institute work as above given, shows how much stronger such work has been from the Committee than from the individual standpoint. It is a question whether the work awaiting doing is of a character that any one man can do as well as a set of men. Probably not. There is no doubt, however, that the Institute will not do the work it should until its members rouse themselves and offer hearty aid to the "Technical Committee." If for any one year the few men who now do the Institute's work would take a well-earned rest, the ensuing meeting would be a striking revelation of how little work the majority of the members are willing to do. Each man who may be guilty of doing less than his share, owes it to himself and the industry to resolve to take up his own burden. If this were done, the Institute would not suffer as it does in comparison with some other Engineering Associations.

A Trial of Costs Suggested.

"Meteor" of the "Electrical Times" is apparently getting very tired of reading the gross falsehoods that have lately and frequently emanated from the electrical industry as to gas having to come down to 7½d. per 1000 cubic feet before it can compete with electricity and the metallic filament lamp, and as to an 8-candle power electric lamp being ycleped a "brilliant" light. So upset is he that he hopes: "Some impartial body of citizens bent upon hunting down the truth will sooner or later equip two model houses (not laboratories) with the rival illuminants on strictly working conditions, and publish annual results." He adds: "We cannot organize it, the gas people cannot organize it; but in the interests of bewildered humanity something of the kind ought to be done forthwith." When the Welsbach Company—before entering into the metallic filament lamp business to give greater scope to their heritage of inflated capital and their exceptional distribution resources—offered a joint trial between themselves as representing incandescent gas lighting and separately several electric undertakings, conditioned so that the result should be beyond suspicion and question, the challenged electricians slunk from the proposed contest in most contemptible fashion. They were not disposed to meet the results—of the losing side having to contribute to some local charity, to bear the costs, and to face the indignity of an admission that they had been pursuing business on the lines of bluff and misrepresentation.

Hidden Lamps and Ventilation.

On the question of electric lamp glare, we may take it that the best method of using metallic filament lamps has been adopted by the Institution of Electrical Engineers to illuminate their new lecture hall. For this hall they have selected cornice lighting, for the express purpose of preventing that glare or "whiplash" on the eyes of which Mr. Mordey, ex-President of the Institution, was talking so pleasantly and frankly a short time since at a meeting of the Society of Illuminating Engineers. But though electric lighting (with the whiplash thrown in) is so much dearer than incandescent gas lighting by the newest types of lamps, to avoid the whiplash by hiding the lamps (as has been thought proper in the Institution lecture hall), and having only reflected light, means an expense for lighting that is altogether beyond the ordinary mortal's financial strength. We are reminded of this by an article in the "Electrician" describing the electrical arrangements in the Institution's new home. Although it is electrically lighted with the lamps situated in the cornices, a 42-inch horizontal discharge ventilating fan (with a capacity of 10,000 cubic feet of air per minute against ¼-inch water pressure) is employed for extracting the air from the hall. This mammoth contrivance is, of course, indispensable with the electric lighting of the hall, just as one of the circulars of the Electricity Publicity Committee was telling us lately an electric fan is indispensable in every electrically-lighted house. It will be remembered that the circular stated: "Wherever electric light is installed, air in rooms can be kept fresh and pure by means of electric ventilating fans"—in fact, they are "indispensable for keeping the house healthy." To light a house by hidden lamps to avoid the whiplash, and to ventilate the rooms as advised, will make the service rendered very costly indeed.

Irish Association of Gas Managers.—The annual meeting of the Association will be held in the Banquet Hall at the City Hall, Belfast, next Tuesday, under the presidency of Mr. R. Harrison, of Monaghan. The proceedings will be opened by the Lord Mayor at 11.30 a.m. We learn from the agenda issued by the Hon. Secretary and Treasurer (Mr. George Airth, of Dundalk), that, in addition to the usual routine business and the delivery of the President's Address, there will be two papers—one on "Exhausters in Small Gas-Works," by Mr. C. Bryan Donkin, of Birmingham; and the other on "Distribution Pressures, Past, Present, and Future," by Mr. W. H. Roberts, of Newtownards. On the invitation of the President, light refreshment will be served at two o'clock. In the afternoon, the shipbuilding yard of Messrs. Harland and Wolff, the lead works of Messrs. Stevenson and Turner, and the gas-works of the Belfast Corporation will be open to inspection. An excursion for the members and lady friends has been arranged for next day to Parkmore, then through Glenariff and on to Garron Tower, where dinner will be served; the return being *viâ* Larne (for tea) to Belfast.

THE COAL AND COKE CONVEYING PLANT AT THE MOOSACH GAS-WORKS AT MUNICH.

A RECENT number of the "Zeitschrift des Vereines Deutscher Ingenieure" contained an article by Herr H. Hermanns, of Aix-la-Chapelle, on the coal and coke conveying plant recently installed at the Moosach Gas-Works of the Corporation of Munich. The following abstract translation of the article has been prepared and is given (with the accompanying illustrations) by permission of the Editor of the "Zeitschrift" and of the Author.

The question of the cheap and most suitable transport of materials is a vital one in all industries which have to deal with the shifting of materials in bulk. Such industries have been impelled to replace hand labour by machinery wherever feasible; and consequently in gas-works of late years manual work in the conveyance of the coal and coke has been restricted as far as possible. The primary object of the adoption of mechanical coal conveyors was the reduction of the amount paid in wages for the transport of the coal; but it was also found that the coal suffered less deterioration when handled by machinery than by hand. The reduction of the number of workmen also diminished the harm which might ensue from strikes. The large coal-store yard, which was formerly customary and indispensable, has now been replaced by tall coal stores which afford very considerable economy in the area of ground required for the storage of a given quantity.

The installation of conveying appliances at the Moosach works was projected and carried out by the firm of J. Pohlig, of Zollstock, near Cologne. A plan of the gas-works is given in fig. 1, and a general view of the conveying plant is given in fig. 2. The coal arrives in railway waggons on an embankment, and is conveyed into the coal-store by means of an electrically driven travelling platform capable of carrying a load of 60 tons. This platform is shown in fig. 6. There are four lines placed one behind the other for discharging the coal in the coal store; and these lines run parallel to those by which the waggons arrive. The waggons are unloaded by hand in the coal store. Travelling waggon tips for discharging the railway waggons were provided for in the original scheme of the installation, as shown in figs. 3 and 4; but these have not yet been installed. Later, however, when the work to be done and the quantity of coal to be handled increase, they will be installed and the capacity of the whole plant will thereby be considerably increased. In fig 4 are shown two cranes A with travelling jacks, which run through the coal store and pick up the coal in grabs, and deliver it on to a steel conveying band D (fig. 3) underneath the floor of the store.

In order that coal may also be brought direct from the railway waggons on to the conveyor, a hopper is provided over the latter in a position beneath the lines alongside the back wall of the store, so that the coal may be tipped from the waggons on their arrival at the store straight into this hopper, and so on to the conveyor. A view of the coal-store, which is capable of holding 16,000 tons of coal, is given in fig. 7, in which the coal loading cranes are shown. The travelling jacks can be transferred from one crane to another at eight points. The cranes are so disposed that the Hone grabs of 1½ tons capacity can take up the coal from the store and deliver it in the gangway between the two travelling cranes on to the band conveyor D, which is provided with a feeding waggon E (fig. 3). The floor of the store is constructed in ridges, with suitably inclined surfaces for the coal to slide down. The band conveyor turns upward at the end, where it is boxed-in with sheet iron in order to prevent the lumps of coal falling off (fig. 8). The purpose of the rise of the conveyor at the end is to dispense with deep foundations for the coal-breaking and screening plant. The latter is erected in a special house attached to the retort-house. It comprises an oscillating screen F (fig. 3), which separates the small coal up to a size of 3 inches, and a breaker below, which crushes large lumps. The sifted and broken coal falls into the buckets of a Hunt's conveyor H, which carries it to the retort-house. This bucket conveyor, which traverses all the coal bunkers from which the retorts are filled, is emptied by means of an automatically acting travelling tappet I (fig. 5), which distributes the coal uniformly among all the bunkers. An automatic weighing machine registers the quantity of coal delivered.

The buckets of the band conveyors are provided with a Sirocco fan and a dust collector for removing the coal dust, which is collected in sacks and utilized. The coal breaking and screening plant is in duplicate, so that one set may be kept in reserve. The whole plant has been designed with reserve equipment, so that interruptions of the working may be avoided. Thus, there is an

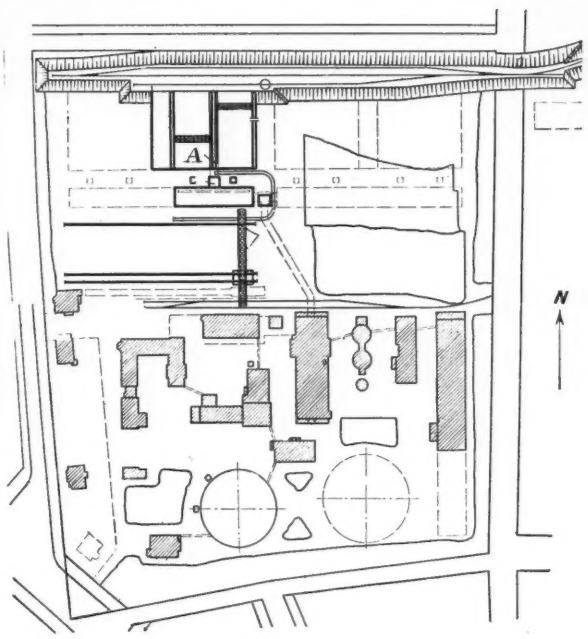


Fig. 1.—Plan of the Coal and Coke Conveying Plant at the Munich Gas-Works.

[A shows the conduit for the band conveyor in the coal-sheds, with the travelling cranes on each side of it. In front of the coal-sheds is the retort-house, with the elevator loading pit at its east end, and the coke yard and bridge crane on the south.]

inclined elevator K (fig. 3), rising up to the roof of the retort-house, which serves as a reserve plant in case of breakdown of the bucket conveyor. In ordinary working conditions this elevator is used for raising the coke for the producers. If, however, the bucket conveyor is thrown out of action, the coal from the store is discharged by the grabs into a charging hopper L, from which an electrically driven waggon M can be loaded. This waggon contains a receiver of about 3¼ cubic yards capacity, having inclined side-flaps. This receiver is taken up by the inclined lift and is discharged into a special hopper, from which the coal is drawn off

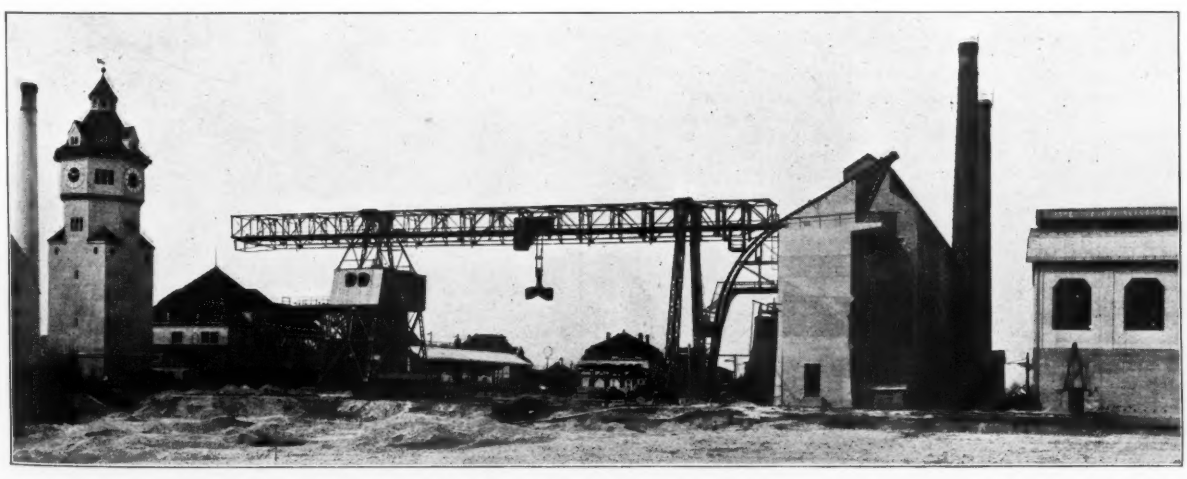


Fig. 2.—General View of the Conveying Plant.

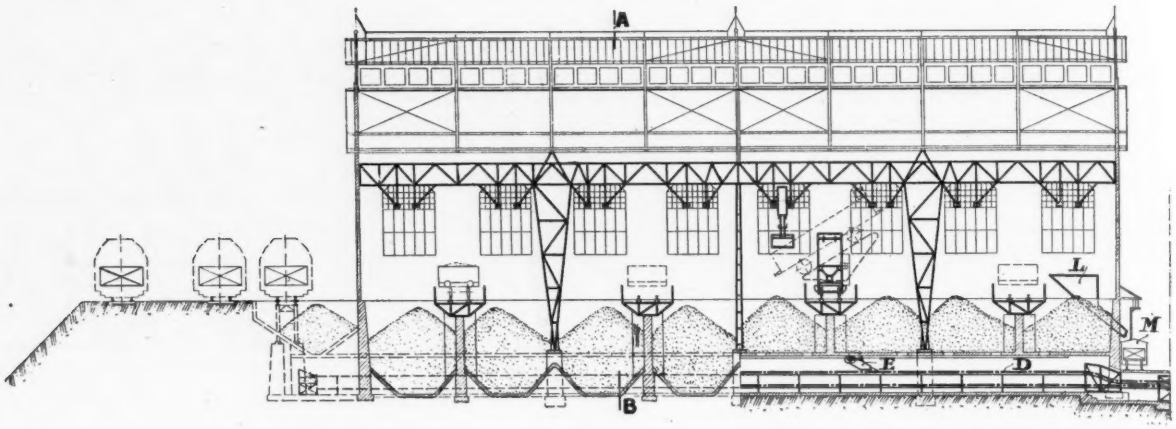


Fig. 3.—Longitudinal Section of the

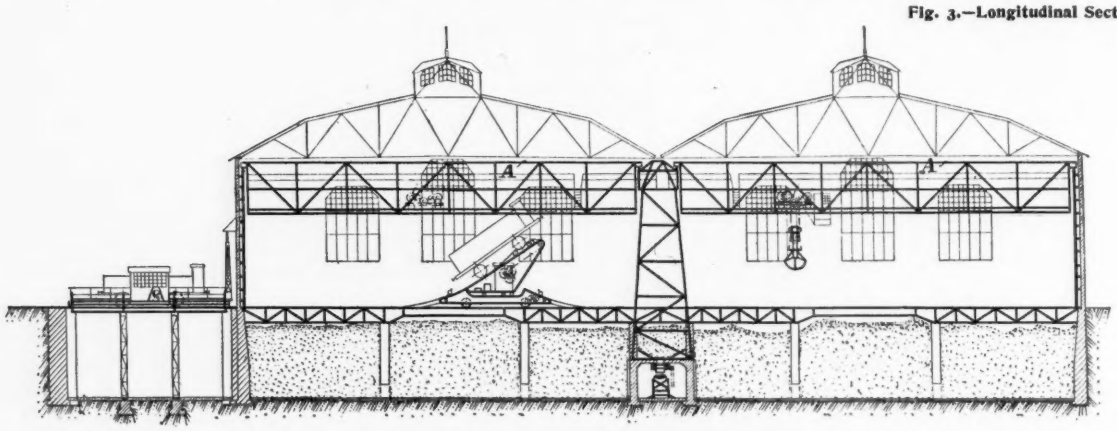


Fig. 4.—Cross Section on the Line A-B of Fig. 3.

into tip waggons N (fig. 5), which are tipped by hand into the coal bunkers above the retorts.

In ordinary working, the electrically driven conveying waggons of the inclined lift are filled with the coke for charging the producers from a hopper, which is carried by a hanging leg of the coke-loading bridge-crane. The coke is conveyed by the lift into a tank of 65½ cubic yards capacity alongside the retort-house. This tank has four outlets, spaced at the distance apart of the length of the waggons; so that four waggons can be filled from it at the same time. The four waggons, which discharge at the side, form one train. Two of them are provided with electric motors, while the other two are trailers. But the motor on one of the waggons in ordinary working is kept merely in reserve. The train on its way to the producers passes over an automatic weighing machine which registers the net weight of the waggons in pairs. If the working of the inclined lift is interrupted, the coke is taken by tipping waggons from the retort-house to the bucket conveyor, from which, at the uppermost part of its track, the coke waggons, standing on the producer charging floor beneath, are filled by means of a shoot. The coke-loading bridge-crane is supported on the one side by the hanging leg already mentioned, and on the other side by the principal supports which run on two rails set at a distance apart of about 21 feet. The bridge has a span of 137 feet; and the track on which it travels is about 236 feet long. The bridge is driven on the rails by a separate motor on each support. The two motors are controlled by a resistance governor which imparts the same speed to each of the supports, and prevents the sides of the bridge getting askew. The governing mechanism is such that, when one support gets in advance, the regulating device comes into action and puts a resistance on the motor of that support. If, despite this, one support gets ahead beyond a certain angle, the travelling mechanism of the bridge is put out of action by an automatic safety-clutch.

The travelling jack T is provided with a grab of 5½ cubic yards capacity. The coke preparing and sorting plant is erected in the framework between the two main supports of the bridge crane

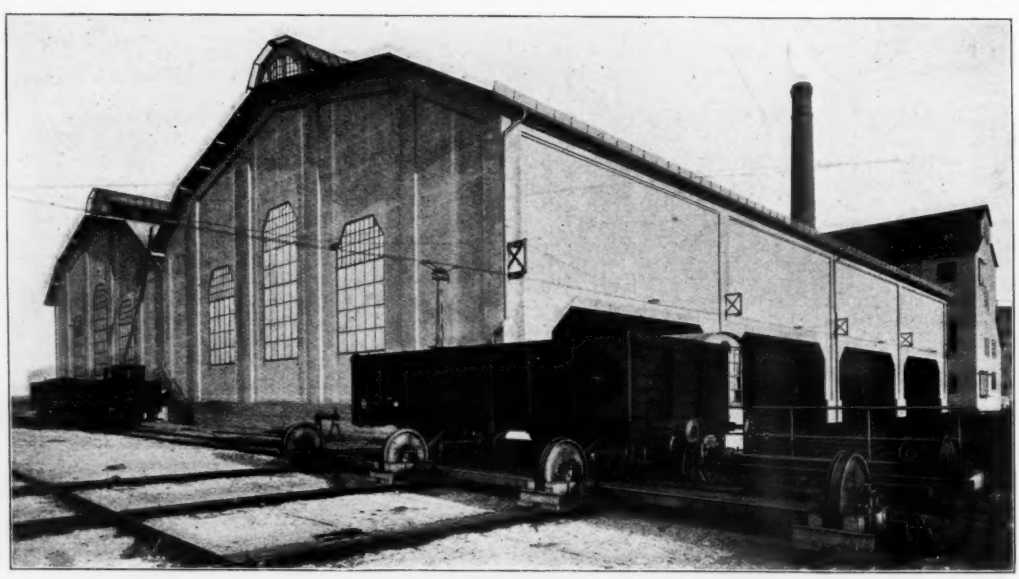
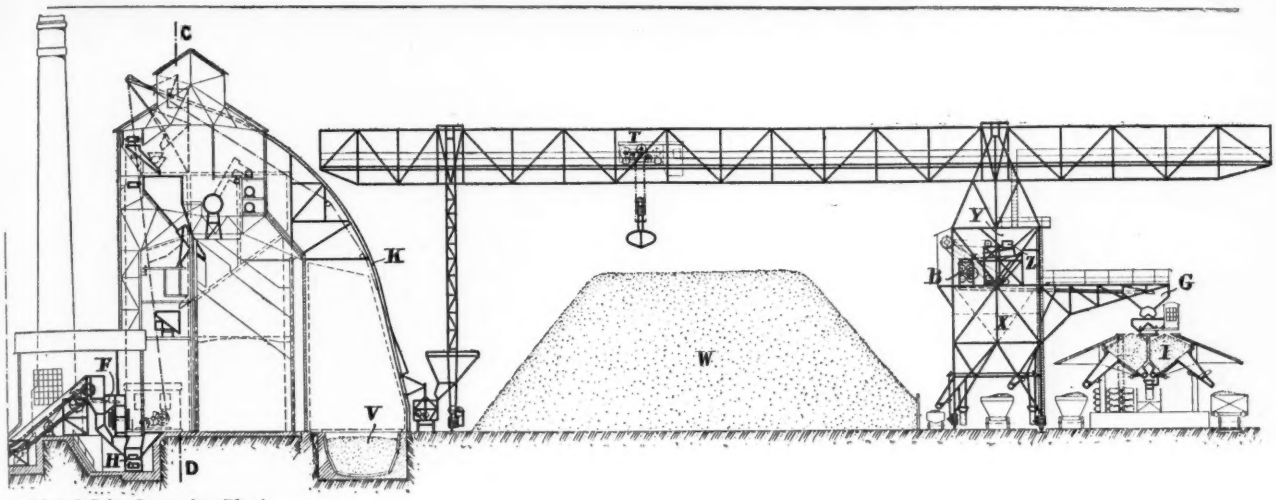


Fig. 6.—Electrically-Worked Sliding-Platform—carrying 60 tons weight.



Coal and Coke Conveying Plant.

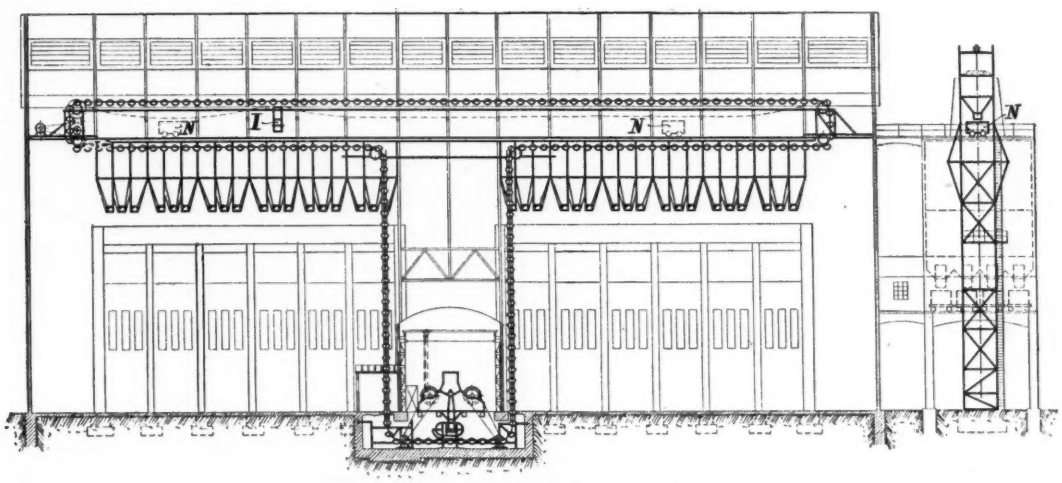


Fig. 5.—Cross Section on the Line C-D of Fig. 3.

(see fig. 9). A pit V (fig. 3) into which the coke is discharged, runs along the side of the retort-house; and from it a grab takes up the coke and conveys it either to the store W for subsequent breaking and sorting in the apparatus X, or, if desired, directly to railway waggons at the overhanging end of the bridge. The coke for breaking is dropped through a delivery funnel Y into the feeding drum Z, from which it passes through an intermediate screen to a double-drum breaking plant B. The intermediate screen separates the small coke, which falls along with the broken coke on to a principal screen underneath. The latter separates the coke into different sizes.

It may be observed that the coke breaking and screening plant is provided in duplicate, so that there is a full reserve in case of breakdown. The coke dust up to two-fifths of an inch in size, and the breeze from two-fifths to three-fifths of an inch, are collected in tanks erected in the framing of the principal supports of the bridge-crane. From these tanks they are drawn off either into carts for sale by retail or into tip-waggons for use on the gas-works. The coarser coke is conveyed into a funnel hopper G which is carried by a bracket on the supports of the bridge, and contains sections for the different sizes of coke. Underneath the bracket are shoots with charging hoppers I (fig. 3), on the top of which runs an electrically driven waggon which distributes the different sizes of coke into the separate sections. The shed in which the sacks are filled (constructed in reinforced concrete) is shown in fig. 10. The coke tanks have a large number of discharging outlets closed by rotary slides. Automatically acting weighing machines show the weights of the filled sacks which are taken to a store capable of holding 3000 sacks. Lateral shoots serve for loading the coke into carts and railway waggons.

In conclusion, it may be stated briefly that at the Moosach works at Munich the coal, arriving in railway waggons, is distributed in the retort-house by means of an iron band-conveyor and a Hunt's bucket-conveyor. An inclined lift is provided for

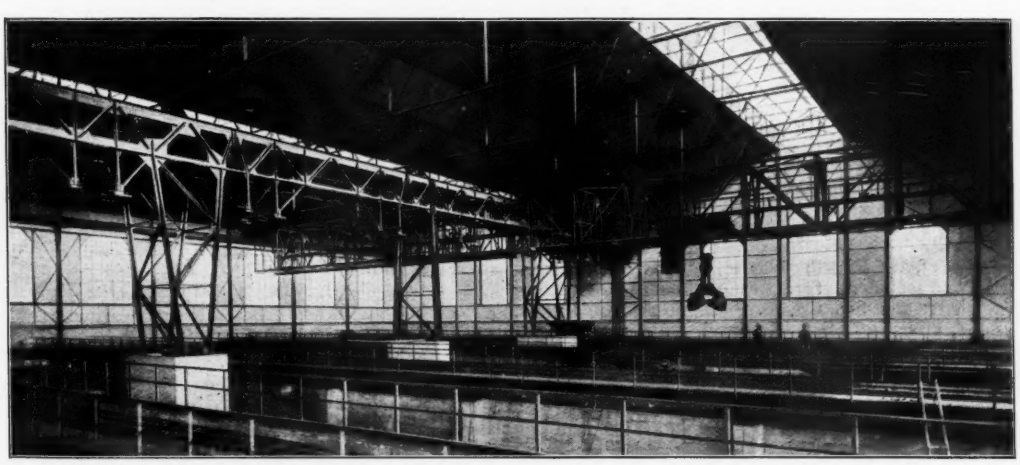


Fig. 7.—Coal Store, with Loading Cranes—to Store 16,000 Tons of Coal.

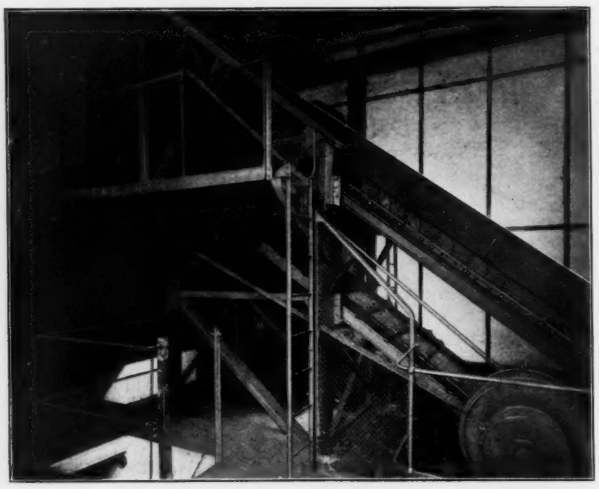


Fig. 8.—The Upturned End of the Steel Band-Conveyor.

charging the producers with coke. A bridge crane with grabs serves for transporting coke. In the supporting column of the bridge-crane the coke breaking and screening plant is placed. A shed (in reinforced concrete) is provided for filling sacks with the coke for storage or transit.

Fig. 9.—The Loading Hopper for Coke Breeze and the Coke Breaking and Screening Plant.

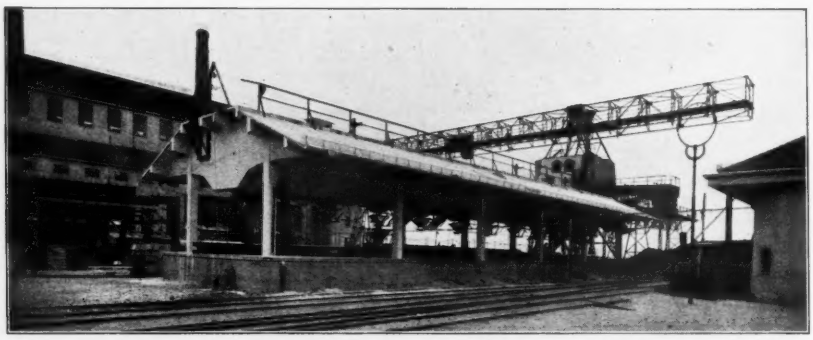


Fig. 10.—Shed for Filling Sacks with and Loading Coke.

ITALIAN GAS SOCIETY.

Last month's issue of our contemporary, "Il Gaz," records the proceedings at the thirty-ninth conference of Italian gas engineers, which was held in Naples in June last. The President for the year, Sig. Ing. Chavannes, occupied the chair and welcomed the members on behalf of the Compagnia Napolitana del Gaz, of which he is the Manager. Cav. Rag. Beria followed, in order to congratulate the Compagnie Union des Gaz upon the successful result of their efforts in the great strike of their gas workers in Italy; and the names of Sigg. Gruss, Morton, Pesce, and Maggioni were mentioned in this connection.

A presentation of an address and gold medal was then made to Sig. Comm. Pouchain, together with his election as an honorary member, to commemorate his retirement after forty-two years from the Società Anglo-Romana del Gaz, and his long connection with the Italian Gas Society, of which he was President in 1877, 1886, 1893, and 1904.

New members were elected to the number of 37, after which suitable tributes were paid to deceased members, Sigg. Chamard, Meneghetti, and Derval. Awards were made to deserving workmen of long years' service; and the establishment of a Benefit Society for gas and water officials was discussed.

It was decided to change the title of the Italian Gas Society, which will in future be styled "Associazione Tecnica Italiana delle Industrie Gas ed Aquedotti"—*i.e.*, Italian Gas and Water Technical Association.

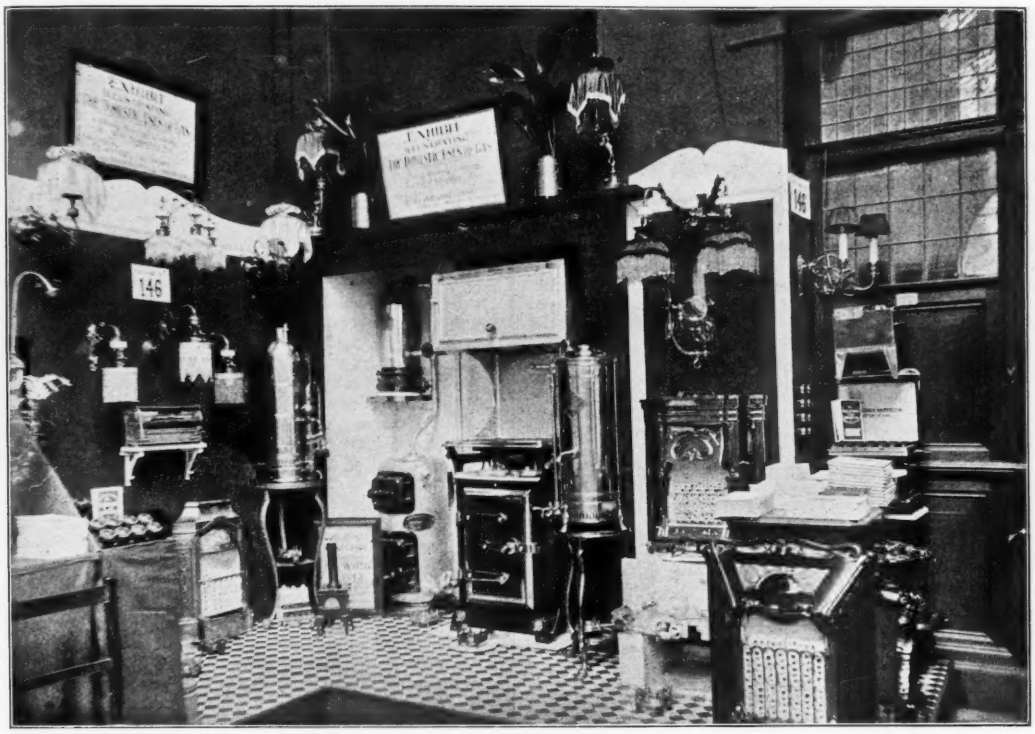
The constitution of, and contributions to, the new Association were considered and modified. Sig. Giovanni Bonn was elected Honorary President; and Sig. Comm. Pouchain accepted the position of Acting-President. Sigg. Bacchelli, Francesetti, Maggioni, and Sospisio were appointed to the Council.

The technical matter contributed to the meeting included a description by Sig. Böhm of the Klönne gas-chambers at Padua, and a review by Sig. Calzavara of recent technical progress made in the gas industry, which is reported at length in the columns of our Italian contemporary.

A visit was paid to the blast-furnaces and coke-ovens of the Società Ilva at Bagnoli, a description of which was previously handed to the members. A dinner given by the Neapolitan Gas Company, and an excursion to Capri, were much appreciated items concluding the proceedings of the annual gathering.

GAS AT A MEDICAL EXHIBITION.

The Seventy-Eighth Annual Meeting of the British Medical Association was held last week in London—for the first time for a good many years—and in connection with it, there was the customary exhibition of things in which the doctor and the surgeon are specially interested. This was arranged at the University of London, Imperial Institute Buildings, South Kensington; but though it was of a very complete character, no notice of it would be called for in these columns, had it not been for the existence of one particular stand. This was under the auspices of the Gaslight and Coke Company, who, fully recognizing the many directions in which gas should appeal to medical men, wisely make it a practice to have a representative show of suitable up-to-date gas appliances in connection with exhibitions, of the character of the one now under notice, which may be held in their district. The attractive stand arranged for last week's exhibition was a great success, judging by the notice which was bestowed upon it by visitors during the short time that the writer spent in the hall. Its completeness will be gathered from the accompanying photograph, which so clearly depicts the different apparatus to be seen there, that a detailed description appears hardly necessary. However, it may be remarked that the important branch, to doctors and nurses, of hot water supply was fully represented—there being a Davey and Roberts coke-boiler connected up with a Wilson circulator; a Ewart "Califont," and a "Gem" lavatory geyser; a Maughan "Teba" instantaneous geyser; a Richmond "Avon" water-heater for laboratories or surgeries, to furnish hot water in small quantities; and a Potterton No. 14 gas-heated boiler of 25 gallons capacity. There was a latest pattern Davis cooker, with hot-closet; and, in addition, there were one or two excellent grillers. The fires were a Richmond "Bavarian," a Main "Worcester," an Arden Hill "Velox," a John Wright



The Gaslight and Coke Company's Stand at a Medical Exhibition.

"Stadium," in armour bright, a Wilson "Sheraton," in white enamel with brass canopy; and a Cannon Iron Foundries fire of Adam design, with brass ornamentation. One of John Wright's "Official" gas-steam radiators, with flue, was also shown. An interesting feature was a varied assortment of Fletcher Russell's laboratory appliances for all kinds of surgical and dental work—muffle furnaces, blow-pipes, crucibles, &c. The lights, which included different styles of large and small inverted burner fittings, were operated automatically on the Telephos system from either of two sets of switches, one of which was fixed at each end of the stand; and there was also on view a Telchow surgical reflector, in connection with an upright incandescent burner on a counterbalanced pendant.

GAS ENGINEERING AND SUPPLY EXAMINATIONS.

Answers to Questions Set.

"GAS ENGINEERING."

In the last four issues of the "Journal," the questions put at the examinations in "Gas Supply" have been dealt with. We now give answers (suggested by a chemical correspondent) to two of the questions in the ordinary grade in "Gas Engineering."

What conditions in the process of carbonization are favourable to the production of the following: Ammonia, cyanide, sulphuretted hydrogen, and other sulphur compounds? Briefly describe the methods usually adopted for removing these impurities from gas.

Temperature is the chief factor in the production of most constituents of crude coal gas, as the natural limits in the formation of the various substances are: (1) Temperature of decomposition of the containing bodies; (2) temperature of combination of elementary gases; and (3) temperature of dissociation of the newly-formed bodies. Ammonia (NH_3) consists of nitrogen and hydrogen; and it is found that the quantity produced increases up to a certain temperature, and then decreases again. At low temperatures, the nitrogen exists in combination as various organic bases, such as aniline, pyridine, &c.; and these are not decomposed. Consequently, there is little free nitrogen to form ammonia. As the temperature increases, the amount of ammonia increases; for the bases referred to are decomposed. Again, a temperature limit is reached; for the NH_3, when sufficiently heated, itself undergoes decomposition, especially in the presence of carbon. Thus:

$$NH_3 + C = HCN + H_2$$
$$\text{and } 2NH_3 + 2C = (CN)_2 + 3H_2$$
$$2NH_3 = N_2 + 3H_2.$$

From the above, it is also seen that very high heats tend to increase the amount of cyanogen in the gas.

As a general rule, the higher the temperature the greater the amounts of sulphuretted hydrogen, carbon bisulphide, and other sulphur compounds. At a high temperature, too, more sulphur is driven out of the coke; and combines with the free hydrogen to form H_2S and with the carbon to form CS_2. The processes for the removal of the above impurities are briefly as follows.

Ammonia.—This being a very soluble gas, it is completely removed by washing the gas well with water in the washer and scrubber. Much ammonia is removed by the water formed in the hydraulic main.

Cyanogen.—Two principal processes are in use for the removal of this gas. The Foulis process is as follows: A mixture of ferrous carbonate and sodium carbonate is used in a separate scrubber. The gas (which must be free from ammonia) is led into this mixture, and sodium ferrocyanide ($Na_4FeC_6N_6$) is formed. Some insoluble prussian blue is often formed owing to partial oxidation. The ferrocyanide is run off as fast as it is produced, and is partially evaporated and crystallized. A process used by the British Cyanides Company depends upon the absorption of the HCN by polysulphide of ammonia $(NH_4)_2S_2$. This is thereby converted into NH_4CNS, ammonium sulphocyanide, which is worked up to its required strength.

Sulphuretted Hydrogen.—This is removed either by the use of (1) iron oxide or (2) lime. In (1) the reaction is represented thus:

$$Fe_2O_3 + 3H_2S = Fe_2S_3 + 3H_2O$$
$$Fe_2O_3 + 3H_2S = 2FeS + S + 3H_2O.$$

Both these reactions go on together. On exposure to the air, the sulphide of iron is re-oxidized, and can be used again until excess of sulphur is deposited in it. Thus:

$$Fe_2S_3 + 3O = Fe_2O_3 + 3S$$
$$2FeS + 3O = Fe_2O_3 + 2S$$

Lime is used for purification; the reactions being as follows:

$$CaO{\cdot}H_2O + H_2S = Ca\begin{matrix}OH\\HS\end{matrix} + H_2O$$
$$CaO{\cdot}H_2O + 2H_2S = Ca(HS)_2 + 2H_2O$$

Lime which has been treated with H_2S is used to absorb carbon bisulphide and other sulphur compounds; the reaction being indicated by the equations:

$$Ca(HS)_2 + CS_2 = CaCS_3 + H_2S$$
$$Ca\begin{matrix}OH\\SH\end{matrix} + CS_2 = CaCS_3 + H_2O$$

Describe the Referees' sulphur test, and give the chemical formulæ on which it is based. If the condensed liquor from 5 cubic feet of gas measured at normal temperature and pressure gives 10·6 grains of barium sulphate, how many grains of sulphur would 100 cubic feet of gas contain? (Ba = 137, S = 32, O = 16.)

The Referees' sulphur test is the standard test by which the amount of sulphur in coal gas is determined. A special form of apparatus is used, so that the gas can be burnt at a certain rate and the products of combustion properly dealt with. The gas is burned at a small bunsen burner connected with a meter, and so arranged that it shall consume 10 cubic feet of gas in a given time—usually fifteen hours. Round the stem of the burner are placed lumps of sesquicarbonate of ammonia—a substance corresponding to the formula $(NH_4)_2CO_3$, $2NH_4{\cdot}HCO_3$, which readily gives off ammonia on being heated. When the gas is burnt, any sulphur in it is converted into sulphur dioxide (SO_2), and at the same time some ammonia is formed by decomposition of the sesquicarbonate. These substances, along with the other products of combustion, are drawn up the chimney surrounding the burner into a vertical glass condenser filled with glass marbles to promote condensation; and this is further connected with a long glass tube or chimney. In the bottom of the condenser a small outlet tube is fixed, so that any condensed product can be run off into a receiver placed beneath the condenser.

The sulphur dioxide being an acid body and the ammonia being an alkali, these two react and a process of neutralization goes on, resulting in the production of ammonium sulphite $(NH_4)_2SO_3$. Thus:

$$2NH_4{\cdot}OH + SO_2 = (NH_4)_2SO_3 + H_2O.$$

Since excess of air is admitted at the burner, the sulphite is oxidized

to ammonium sulphate. This is dissolved in the water which forms in the condenser, and is then run off into the receiver. The chimney and condenser are then well washed out with distilled water, and the washings added to the condensed products of the combustion. The liquid is divided into two equal portions; and one of these is used for estimation. The sulphur is determined as sulphate by precipitating it as barium sulphate. This latter substance is almost entirely insoluble; and so the whole of the sulphur is precipitated as sulphate, thus:

$$(NH_4)_2SO_4 + BaCl_2 = BaSO_4 + 2NH_4Cl.$$

Excess of a solution of barium chloride is added to the condensed sulphate of ammonia and the mixture boiled for a few minutes. Complete decomposition ensues; and the barium sulphate obtained is separated by filtration. The precipitate is washed with hot water until the clear filtrate gives no precipitate with silver nitrate. This is necessary in order to ensure the removal of the whole of the barium and ammonium chlorides. The filter containing the barium sulphate is then carefully dried in a steam or hot-air oven, and transferred to a weighed platinum crucible. The crucible is strongly heated over a bunsen burner until the whole of the filter paper is consumed, and nothing but ash left of it. It is then allowed to cool, and is weighed carefully; the increase in weight being due to the amount of $BaSO_4$ obtained.

Since only half the condensed $(NH_4)_2SO_4$ was used, this is equivalent to the amount from 5 cubic feet of gas. Now the molecular weight of barium sulphate is $137 + 32 + 64 = 233$; and this contains 32 parts by weight of sulphur. Suppose, then, that the weight of $BaSO_4$ obtained in an experiment was x grammes (or grains, &c.), then since 233 grains of $BaSO_4$ contain 32 grains of sulphur, then x grains contain $\frac{32 \times x}{233}$ grains. But this is from 5 cubic feet of gas; $\therefore$ in 100 cubic feet there would be $\frac{20 \times 32 \times x}{233}$ grains of sulphur, or approximately $\frac{11 \times x}{4}$ grains of sulphur per 100 cubic feet.

In the example given, 10·6 grains of barium sulphate were obtained. Substituting this weight for x in the above expression, we get $\frac{11 \times 10{\cdot}6}{4} = 29{\cdot}15$ grains of sulphur per 100 cubic feet of gas.

"GAS SUPPLY."

In the course of the questions and answers in the Honours Grade given in the "JOURNAL" last week, the illustrations which formed the answer to question 9 (A) (p. 260) were by inadvertance omitted. These we now give, with the question.

9 (A). Give diagram showing the candle power at different angles below the horizontal of (*a*) any inverted burner, and (*b*) any upturned burner, each working at ordinary (say, 2 inches) pressure, and consuming not more than 4 cubic feet of gas per hour. A simple sketch in sectional elevation of each burner must also be given.

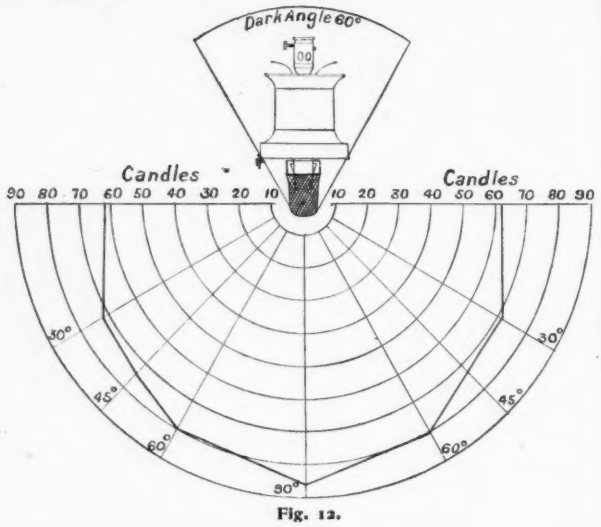


Fig. 12.

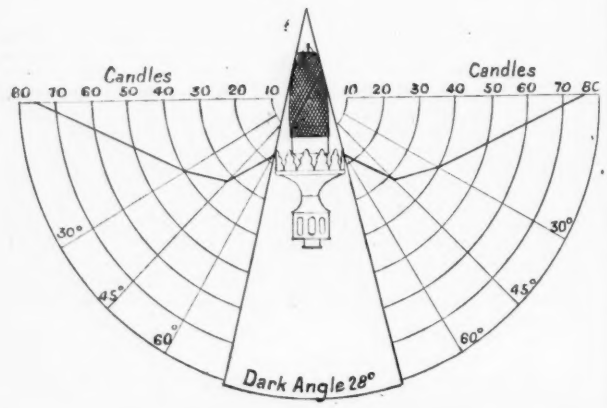


Fig. 13.

RETORTS v. LARGE CHAMBERS.

IT was mentioned in our report of the proceedings at the annua meeting of the Association of Gas and Water Engineers of Austria-Hungary, at Innsbruck on May 27 last ["JOURNAL," Vol. CX., p. 695], that a paper was read by Dr. R. Geipert, of the Imperial Continental Gas Association's Berlin staff, on the relative advantages of retorts and large carbonizing chambers. A good deal of the matter dealt with in this paper has been already covered in previous reports by Dr. Geipert or some of his colleagues. Certain new points were, however, raised in the Innsbruck communication in regard to alleged defects in the working of large carbonizing chambers; and these allegations were referred to in Herr Rauch's remarks on the Munich chambers, of which a translation was given in last week's "JOURNAL" [*ante*, p. 262]. We therefore give a summary of Dr. Geipert's paper in which only the points of novelty are dealt with fully. The paper is published in full in a recent number of the "Zeitschrift des Vereines der Gas und Wasser Fachmänner in Oesterreich-Ungarn."

After referring to the paramount importance of economy in retort-house operations, and especially to the reduction of the fuel account, the author proceeds to say that the choice of the right system of carbonizing determines to a very large extent the efficiency of the working of a gas-works. The fundamental differences in the carbonizing plant available lie in the size of the vessels used and in their disposition. The systems of setting may be classified accordingly; and it becomes pertinent to consider which principle is preferable. The disposition of the carbonizing vessel obviously is of great importance in regard to economy of working; and the transition has been made from the horizontal to the inclined, and finally to the vertical, position with a view to economizing labour. The utilization of the force of gravity to bring the coal into the retort or oven, and to discharge the coke from it, is secured when the vertical position is adopted. But until recently the latter was not considered practically available. Nevertheless, this position is now accepted; and results obtained show its advantages.

The author quotes the report of the make and quality of gas obtained at Sunderland with the Dessau vertical retorts, as given by him in Table III. on page 168 of the "JOURNAL" for April 19 last, in the translation of his paper on the "Dessau Settings of Eighteen Vertical Retorts." He states that the other modern systems of retorts which are in use in England give results at least 4 per cent. inferior to the Dessau. He refers also to other reports from the Cologne, Zürich, Oberspree, and Mariendorf works [see "JOURNAL," Vol. CVII., p. 30; Vol. CIX., p. 27]. The distinction between retorts and chambers ordinarily is one of size, and, consequently, of the ratio of the heating surface to the quantity of coal carbonized. The question as to the influence of this relation on the factors which determine the economy of gasification is one of considerable importance. The correct answer to it will settle whether it is most advantageous to construct settings of narrow retorts having a comparatively large heating surface or large chambers having a relatively small heating surface.

In horizontal and inclined retorts there is a free space above the coal, in which decomposition of the products of gasification occurs. It is thus not easy to distinguish between the primary products of the gasification of the coal and the secondary decomposition products. The size of the free space also affects the transference of heat. Vertical retorts, being entirely filled with coal, are more favourable to observation. At the Mariendorf works, in Berlin, investigations have been made with vertical retorts in one case wider and in the other case narrower than the standard size. These experiments have afforded the means of judging the effect on gasification of the extent of the heating surface, and, consequently, have thrown light on the question of whether retorts or large chambers are the better. The results were unfavourable to large chambers on account of the heavy expenditure on fuel, if for no other reason. It was in consequence of the results of these investigations that the setting of eighteen narrow vertical retorts was constructed in place of the original setting of twelve retorts; and the results realized with the new setting have already been reported. ["JOURNAL," Vol. CIX., p. 27.] Further investigations with the setting of eighteen vertical retorts have, however, been made by Herr A. Wein, the Chief Chemist of the Buda-Pesth Gas-Works, and also by the author. The results obtained in these several trials of the setting of eighteen vertical retorts are summarized in the accompanying table.

Comparing these figures with results previously obtained with the settings of twelve vertical retorts, it will be seen, the author says, that they are much in favour of the setting of eighteen retorts. Consequently, it may be accepted that the gasification of the coal is favourably influenced by the relative increase in the heating surface. In regard to the effect of the increase of the heating surface on the fuel consumption, the author proceeds to follow the argument which he gave in his previous paper [*vide* "JOURNAL" for April 19 last, p. 167], which led him to conclude that the amount of fuel consumed in the setting of eighteen vertical retorts per 1000 cubic feet of gas made is only about two-thirds what it is with the Munich carbonizing chambers. He also quotes again the figures given in his former paper as to the greater capacity of the setting of eighteen vertical retorts and the better transmission of heat by which a higher duty is obtained from the setting. He points out again that the greater production

Results of Gas-Making Trials in Settings of Eighteen Vertical Retorts.

Description of coal . .	Silesian.		Dombrauer.			Saar.	Westphalian.
			Large.	Nuts.	Unscr'ned.		
Observer	H. Bunte.	R. Geipert	A. Wein.	A. Wein.	A. Wein.	R. Geipert	R. Geipert
Make of gas per setting per 24 hrs., c.ft..	262,218	245,090	252,153	255,685	247,916	255,332	244,737
Make of gas per ton of coal, c. ft. . . .	13,384	14,281	14,532	13,743	14,137	13,814	14,353
Gross calorific power, B.Th.U. per c. ft. .	543	547	553	545	541	564	546
Ammonia, per cent. by weight of coal . .	—	0·349	0·288	0·305	0·282	—	0·337
Tar, per cent., by weight of coal . .	—	6·226	5·780	6·090	5·410	—	4·600

of the setting reduces the cost of the installation and the amount of the wages per 1000 cubic feet of gas made. As a result of his observations, he concludes that the correctness is established of the principle applied in the setting of eighteen vertical retorts—viz., the increase in the amount of heating surface relatively to the quantity of coal carbonized. Conversely, he contends that it is shown to be wrong to diminish the heating surface as is done in large carbonizing chambers. In all cases he believes that retorts prove preferable to chambers.

In regard to the comparison of retorts and chambers, the author quotes results obtained at Leipzig and at Dresden with Munich chamber settings.* The Leipzig results are given on the authority of Herr Reinhard, the manager of the gas-works there, and show a make of 11,518 cubic feet of gas per ton of coal, having a net calorific power of 449 B.Th.U. per cubic foot, which the author assumes corresponds to a gross calorific power of about 512 B.Th.U. per cubic foot. Thus the calorific valuation figure, or B.Th.U. obtained in the gas per ton of coal carbonized, is 5,897,216. This result can be readily obtained or surpassed with any retorts. In Leipzig, indeed, the horizontal retorts have only given a make of 10,657 cubic feet per ton; but the calorific power of the gas is not stated, and it may be assumed that it was higher than that of the chamber gas. Herr Göbel, the Manager of the Dresden Gas-Works, gives a make for his chamber settings of 13,922 cubic feet per ton of coal, the gas having a specific gravity of 0·58. The latter figure shows that the gas is not pure coal gas, which would have a specific gravity at the most of 0·45, but a mixture of about 78 per cent. of coal gas and 22 per cent. of flue gas. Thus the make of coal gas obtained per ton of coal is actually reduced to about 10,900 cubic feet.

The author contends it is highly desirable that the proportion of nitrogen in gas made should be determined (most easily by the combustion of a measured volume of gas over copper oxide) in order to ascertain that the gas is not diluted with flue gas. The gas from vertical retorts, he says, never contains more than 1·5 per cent. of nitrogen, which is no more than is formed synthetically in the gasification of the coal. Herr Reinhard reported that the chamber gas made by charging the chambers once in twenty-four hours was liable to inadmissible fluctuations. Therefore, the project of working only in the day-time would have to be given up, and more than one shift of men would have to be employed. This disposes of the contention of the advocates of carbonizing chambers that with them night work would be dispensed with. If night work were dispensed with, exceptional measures would have to be taken to mix the gas produced at different times, which measures would be attended with considerable expense.

It is most important to the consumer, more especially when the inverted burner is used, that the gas should be throughout of uniform quality. Herr Reinhard also throws an unfavourable light on the distribution of the heat and the condition of the chambers at his works. The middle chamber of the setting is considerably hotter than the others, and has to be charged every twenty hours in order that it may not become overheated; while the outer chambers require twenty-four hours to work off the charge. The chambers which started work in December are so unsound that a vacuum of less than 1-10th of an inch in them causes so much flue gas to enter that the gas is reduced in quality to an unpermissible extent. Conversely, a reduction in the vacuum entails loss of gas; and, consequently, the exhauster must be most carefully regulated in order to avoid slight fluctuations in the vacuum on the chambers. The results obtained at Dresden by Herr Göbel show that flue gas is sucked in, and that the satisfactory make of gas is obtained at the expense of great fluctuations in its calorific power. It is recognized in coke-works that the ovens are constantly getting unsound owing to the readiness with which they become distorted. Retorts are preferable because they are absolutely sound and retain their shape.

The author concludes his paper with detailed analyses of the Silesian and Dombrauer coals used in the trials of which the results are reported in the table. The figures given in the table for the make of gas per ton refer to the coal in the air-dried state. The Silesian coal in this state contained 22 per cent. of moisture and 6·1 per cent. of ash; the Dombrauer large coal, 1·6 per cent. of moisture and 6·5 per cent. of ash; the Dombrauer nuts, 1·7 per cent. of moisture and 8·5 per cent. of ash; and the Dombrauer unscreened coal, 1·7 per cent. of moisture and 8·9 per cent. of ash. Steam was introduced into the retorts for two hours out of the eleven hours, which was the time usually allowed for working off the charge.

The author's general conclusion is that for the dry distillation of coal it is disadvantageous to employ a relatively small heating surface, such as occurs in large chambers, and that a relatively large heating surface, such as may be obtained by narrow retorts, is to be aimed at.

* It may be pointed out with reference to these figures that Herr Rauch, in the remarks given in last week's "JOURNAL," stated that the Dresden chambers here referred to were not of the Munich type [*ante*, p. 262].

GAS OILS AND OIL GAS.

By Dr. H. HEMPEL, of Berlin.

THE following is an abstract translation of a lengthy thesis by Dr. H. Hempel, of Berlin, which formed his qualifying dissertation for the degree of Doctor of Engineering. The research work to which it refers was carried out at the Chemical-Technical Institute of the Technical College at Carlsruhe, under the guidance of Dr. H. Bunte, Professor in the Institute. The thesis was published in full in recent numbers of the "Journal für Gasbeleuchtung."

INTRODUCTORY.

The author refers first to the fact that pyrogenous actions have been applied industrially for about a hundred years in the manufacture of coal gas or oil gas, and it has been recognized in the course of time that those bodies were specially suitable for the manufacture of gas which were poor in oxygen and, consequently, rich in hydrogen and carbon. The manufacture of oil gas first attained large dimensions when the higher fractions of mineral oils became available as raw materials. In Germany, the distillates from lignite and bituminous shales were at first the only materials used, but petroleum distillates have been used for a long time in the United States of America, and more recently in European countries for the carburetting of water gas. These petroleum distillates also are used to a smaller extent in the manufacture of pure oil gas. Different results are afforded by different oils; and consequently it is necessary to determine the value of particular oils for gas-making. At one time it was considered sufficient to ascertain by the physical properties of the oil—viz., its specific gravity, viscosity, and fractionation—that the oil was a normal technical gas-oil distillate. But it was soon recognized that the heat and time of gasification affected the yield, and the value of the oils was then ascertained by gas-making trials in apparatus in the laboratory, and a valuation figure was calculated from the results of the trials. The valuation figure, however, did not always agree with the working results carried out on a large scale.

The practical solution of these questions involved the theoretical investigation of the pyrogenous decomposition of hydrocarbons at high temperatures. Work in this direction, in continuation of that of Berthelot, has been done by Lewes, F. Haber (working in turn with Samoylowicz and H. Oechelhaeuser), E. Müller, Lenze and Limberg, Ross and Leather, and A. Spiegel. Some of these observers studied the deteriorating effect of oxygenated bodies on the results of gasification, while others demonstrated the importance of a high proportion of hydrogen in the gas-oils. The author has employed a new apparatus which admits of clear separation of different influences, and with it has made a series of comparisons of the gas-making power and value of gas-oils. He has further investigated the phenomena of carburetting when the oils are gasified in the presence of gases such as hydrogen, carbonic oxide, and nitrogen.

THEORIES OF PYROGENOUS DECOMPOSITIONS.

The author first reviews the various theories put forward from time to time in regard to pyrogenous decompositions. The oldest theory is that of Berthelot, who held that carbon was never directly separated in the first stage of the pyrogenous decomposition of hydrocarbons, but that, by the continuous combination of the molecules to form more complex bodies, richer and richer in carbon, with the liberation of hydrogen, carbon ultimately was produced. Thus according to this theory the separation of carbon was effected only by condensation. He obtained acetylene as a product of decomposition of the most varied organic bodies, and attached special importance to the formation of acetylene and its polymerization in pyrogenous reactions. The occurrence of many products was explained by Berthelot as being due to their splitting off in subsidiary reactions. He assumed that a complex equilibrium existed for each stage of temperature between simple and complex hydrocarbons with carbon and hydrogen. Lewes later regarded the subsidiary reactions, by which Berthelot had assumed that certain products were split off, as primary reactions, and he did not recognize Berthelot's state of equilibrium. Lewes supposed that acetylene condensed continuously at moderately high temperatures, and at still higher temperatures began to decompose into its elements. The separation of carbon was due only to the decomposition of acetylene, and the formation of carbon by condensation did not occur. Thorpe and Young investigated the effect of pressure and moderately high temperatures on the decomposition of paraffin hydrocarbons. They found that these

hydrocarbons were decomposed primarily into olefines and lower paraffins, with simultaneous formation of only a small amount of gaseous products. Armstrong and Miller showed that simple gases with olefines, benzol, and higher aromatic bodies resulted from the splitting-up of petroleum hydrocarbons at high temperatures under atmospheric pressure. Their observations, however, led to the conclusion that the splitting-up occurred at the ends of the chain, whereas previous observations had been in favour of hydrocarbons splitting-up in the middle of the chain. Haber's investigations of the gasification of hexane and trimethylethylene at 600° to 900° C. gave results analogous to those of Armstrong and Miller. It followed from these researches that instead of hydrogen being split off it was transferred, while at the same time small terminal members of the component hydrocarbons with less than three carbon atoms were separated. These separated hydrocarbons were mainly methane, ethane, and ethylene. The lack of stability of the products of decomposition was also demonstrated by the fact that the residual unseparated molecule resulting by the splitting-off of gaseous products combined with other residues to form complex compounds. In this manner, tarry products were built up. Equilibriums, as understood by Berthelot, did not occur according to our present knowledge of equilibrium reactions.

The author next proceeds to discuss theoretical considerations relating to pyrogenous reactions based on the results of gas analyses. He concludes that it must be assumed that the groups splitting-off in the reactions must be chiefly those with either one or two atoms of carbon. The single-atom terminal groups must predominate, as methane occurred as a chief constituent of oil gas, and it could not result from a gas containing a high proportion of carbon. The members with two atoms of carbon—such as ethylene and ethane—did not result mainly from the further decomposition of the unsaturated residues left when the methane was splitting-off, as, if this were the case, constituents of higher boiling point would have been found in oil-gas tar. If the foregoing assumption were correct, this tar must contain bodies with ring-shaped formulæ. The investigations so far made on oil-gas tar supported this conclusion. The conditions moreover were not changed if gasification took place in the presence of indifferent gases, such as nitrogen or carbonic oxide. If, however, hydrogen was present during gasification chemical reactions took place. The resulting gases were substantially identical with those produced by the simple gasification of oil; but the yields of methane, ethane, and ethylene were increased considerably per unit weight of oil, while the tar was more freely fluid and in smaller quantity. It would appear in consequence that the hydrogen which occurred in simple oil gas as a result of secondary decompositions, exerted an influence on the splitting-up of the molecules which occurred in the gasification of oil. Experiments with varying amounts of hydrogen had shown that when the hydrogen reached a certain proportion—viz., 50 to 70 per cent. of the final gas—the formation of gaseous hydrocarbons was confined to a certain limited quantity. It would, therefore, appear that the average proportion of hydrogen in simple oil gas—viz., about 15 per cent.—was capable of exerting considerable action.

The Principles of the Valuation of Gas Oil.

The author then refers to methods followed for the valuation of gas-oil. The laboratory apparatus for testing the yield of gas from oil devised by Wernecke (now generally used in Germany), has been unfavourably reported upon by many observers; but others—*e.g.*, Helfers and Eisenlohr—have found that the valuations which it gives agree generally with the results obtainable on the practical scale. In Germany, oils are commonly valued on the basis of Hirzel's valuation figure, which is the product of the yield of gas (stated in cubic metres per 100 kilos. of oil) and the illuminating power of the gas when consumed at the rate of 35 litres per hour. This valuation figure is, however, unsatisfactory, as the light and the yield of gas do not vary proportionally. The illuminating power depends primarily on the quantity of heavy hydrocarbons, which quantity varies with the conditions of gasification in a different proportion to the yield of gas, so that the product is not a constant. Very different values are, consequently, obtained with only small variations in the experimental conditions for one and the same oil. Helfers proposed to take into account also in a formula for the valuation of gas-oils the amounts of tar and coke produced in gasification. But his empirical formula likewise is unsatisfactory, in that the values it gives are affected by changes in the temperature of gasification. Owing to the diminished importance of the illuminating power of gas, it has since been proposed to value oils for gas-making on the basis of the product of the yield of gas and its calorific power. Ross and Leather have proposed to take as a valuation figure the product of the yield of gas and the percentage of olefines contained in it. The same objection to this valuation figure applies as to those of Hirzel and Helfers. The calorific valuation number on the other hand clearly expresses the total energy obtained, and it is nearly constant for changes of temperature of ± 40° C. All the valuation figures attain a maximum at the temperature which is found most favourable for the gasification of the particular oil; but the exact expression of the gas-making value of the oil is only afforded by the calorific valuation number.

Pyrogenous decompositions are primarily functions of (1) the temperature; (2) the surface and duration of heating; and (3) the catalyzator present. The experimental apparatus of Wernecke fails in that it has not a sufficient length maintained at constant temperature and a sufficient capacity compared with apparatus used on the technical scale. The investigations made by the author were carried out with an apparatus which presented a sufficiently large surface of which an adequate length was maintained at a constant temperature. Only in this way is it possible to produce the products of pyrogenous splitting-up of the oil in precisely the same conditions. The gasification could be carried out with this apparatus at different temperatures which could be exactly determined.

The investigations have shown: (1) The gas-making power of oils; (2) the smaller differences in the gas-yielding capacity of the oils than could be ascertained with former methods; (3) the great dependence of the composition of the gas in respect of its content of ethylene and hydrogen on the temperature of gasification; (4) the small dependence of the calorific valuation number, within narrow limits, on temperature (varying ± 40° C.) and rate of inflow of the oil (varyingly 25 per cent.); (5) that the most favourable temperature of gasification for the oils examined is between 745° and 790° C.; and (6) that the assumption of Spiegel that the gasification value of the oil and the amount of hydrogen it contains are related is true qualitatively, but not quantitatively.

The gasifications of the oils in the presence of foreign gases were carried out in the same manner as the simple gasifications of the oils. The results obtained were entirely concordant when the oils were gasified in a current of carbonic oxide or of nitrogen. The dilution with indifferent gases diminishes the secondary decomposition of the olefines and of ethane. Consequently, the percentage of methane falls by a little, while the percentage of ethylene rises. Nevertheless, the product of the yield of gas and the calorific power is not changed. When, however, the oil was gasified in a current of hydrogen at temperatures of 740° to 880° C., it was observed that: (1) In all the experiments hydrogen was to a large extent taken up by the products splitting-off, hydrogen was no longer split-off by the oils themselves; (2) there was always a diminution of the total volume of gas, as, for instance, when the ratio of the mixture was 1 to 2 the contraction amounted to about 15 per cent. of the total yield calculated from the sum of the oil gas and the hydrogen added; (3) there was a diminution of the amount of tar formed; (4) the coke produced diminished by 1·5 to 3 per cent. when compared with the production in the simple gasification of the oil; and (5) the gas showed an average gain in energy of 15 per cent. of the heat of combustion of the simple oil gas.

It will be seen that when gasification takes place in a current of hydrogen the calorific valuation number is appreciably increased. But it appears also that the relative values of the oils, as ascertained by simple gasification, are substantially maintained when the gasification is conducted in a current of hydrogen. The valuation number deduced from the simple gasification of the oil therefore affords a certain criterion of the carburetting power of the oil. Consequently, also the proportion of elementary hydrogen in the oils serves as an indication of their probable relative value as carburetting agents.

(To be continued.)

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California	275·18	21·0
Colorado	4·00	20·0
Connecticut	30·00	12·5
Delaware	1·40	5·0
District of Columbia	6·00	3·0
Florida	1·60	30·0
Illinois	191·50	16·4
Indiana	145·50	10·0
Iowa	44·60	10·0
Kansas	—	20·0
Louisiana	7·69	—
Maryland	3·00	23·0
Massachusetts	138·00	11·4
Michigan	81·75	11·5
Minnesota	16·50	5·0
Missouri	39·00	6·5
Nebraska	16·00	1·75
Nevada	25·00	2·0
New Hampshire	20·00	5·0
New Jersey	41·86	4·9
New York	26·70	13·0
North Carolina	6·00	6·0
Oklahoma	33·41	7·5
Oregon	31·80	13·5
Pennsylvania	159·50	47·5
South Dakota	7·50	3·0
Texas	4·00	5·0
Vermont	3·00	15·0
Virginia	33·25	18·8
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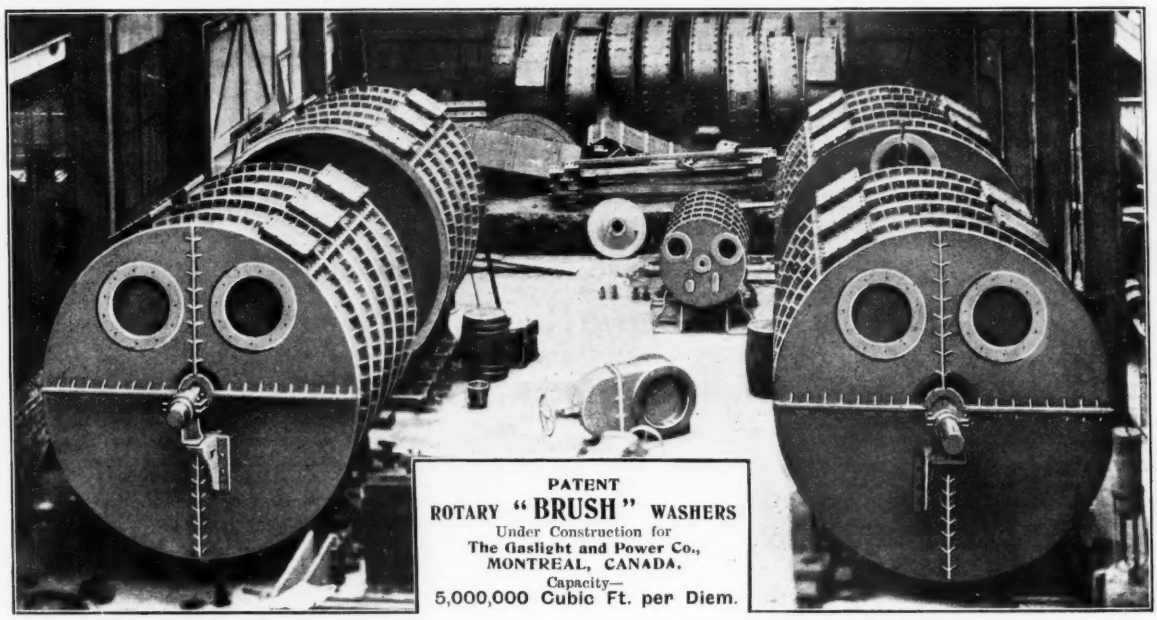

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¶ Striking Testimony concerning the DETACHABLE GILLED TUBE.

THE original of the letter produced below, as well as the actual tube referred to, may be inspected at our City Show-Rooms:

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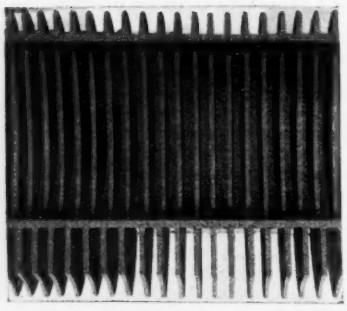
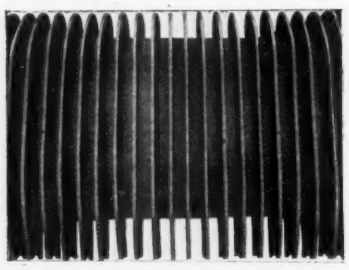


The Gilled Tube, showing Inside Fins through which water passes.

No Depreciation of the Tube is apparent, either Internally or Externally.



The Gilled Tube, showing Outside Fins where Gas Fumes circulate.

"July 18th.

"The tube I send you a section of herewith was in use for two years almost continuous service, on water having an analysis as below:—

Total solids . . .	135·28 parts per 100,000.
Silica	0·80 " "
Iron oxide and alumina .	2·48 " "
Lime	21·60 " "
Magnesia	10·89 " "
Sulphuric acid (as SO_3) .	31·75 " "
Chlorine	22·85 " "
Alkalinity (in terms $CaCO_3$)	24·38 " "
Hardness	68 degrees (Clarke).

The steam pressure was 200 to 250 pounds per square inch, and each tube was evaporating about 100 pounds of steam per hour. The water was well water from our works," &c., &c.

From the last paragraph quoted above regarding steam pressure, it will be seen that the water in the tube must have been at a temperature of from 380° to 400° F., whereas the highest temperature which it will reach in the "Gilled" Boiler on a circulating system is 180° F.

Water sufficiently bad to affect these gilled tubes is much too bad for household use.

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NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

Annual Meeting at Dunfermline.

The Forty-Ninth Annual Meeting of the Association was held in Dunfermline on Thursday last. An exceedingly comfortable meeting-place was provided by the Town Council, who put the Council Chamber in the Municipal Buildings at the disposal of the Association; and there members assembled in large numbers about half-past ten o'clock. Provost HUSBAND took the chair, having beside him several members of the Town Council, including Mr. T. Stewart, the Convener of the Gas Committee, other members of the Committee, and the President of the Association (Mr. Alexander Waddell, of Dunfermline).

MUNICIPAL WELCOME.

The PRESIDENT said that at their forty-ninth annual meeting the Association were honoured by the presence of Provost Husband, and other members of the Town Council, and he had much pleasure in asking the Provost to say a few words.

Provost HUSBAND gave the Association a hearty welcome to the town of Dunfermline. They could not, he said, be better employed than in rubbing shoulders with one another, and discussing such questions as he saw on the programme of business. The majority of the Town Council of Dunfermline were convinced that it was a good thing for their officials to come together year after year to discuss questions which must be of interest to all of them. They were pleased indeed, a year ago, when the Association honoured them by electing their Gas Manager—Mr. Waddell—as their President. They showed their appreciation of Mr. Waddell's services a few days ago by unanimously voting him an increase of £50 in his salary. There were reasons why they, as an Association of Gas Managers, should meet in Dunfermline. He thought they were indebted to the "Kingdom of Fife" for the origin of the Association, though he had been told that morning that its origin was wrapt in mystery. He gathered, however, from a paper handed to him by their Gas Manager, that as far back as 1862 four gas managers met in Cupar-Fife and formed the Association. The gentlemen he named were Mr. Lowder, of Leven, Mr. Myers, of Broughty Ferry, Mr. Proctor, of Forfar, and Mr. Mackenzie, then of Cupar-Fife, and afterwards, for a very long time, their Manager at Dunfermline. Mr. Mackenzie very soon became Secretary of the Association, and continued to give good service for a period of seventeen years. He believed they afterwards elected as President Mr. Lowder, of Leven, and as Vice-President Mr. Gray, of Cupar—the man who was afterwards in Dunfermline, immediately before Mr. Mackenzie. The membership of the Association was now 273. There was, he believed, one Association in existence prior to the North British—viz., the Waverley Association, which was formed during 1862. When he brought the matter of the meeting of the Association before the Town Council, they willingly placed the Municipal Buildings at their disposal. He welcomed the members to Dunfermline, and hoped their visit would be a pleasurable and a profitable one in every respect.

Mr. J. W. NAPIER (Alloa) said he was sure they all appreciated very much the hearty welcome accorded to the Association by the Provost. He had given them some memoirs in connection with the Association; and these, he was sure, were particularly interesting to the city of Dunfermline because its Manager had occupied a very important place in the affairs of the Association. They, as technical men, would like to say to the legislators of the burgh of Dunfermline that while they took an interest in the Association that interest extended to a very much larger sphere. They had not only an interest in the practical business of gas manufacture, but they recognized their responsibilities outside the gas-works gate—to the consumers and to the public; and while they had their duties, as gas manufacturers, in supplying the public with cheap and good gas, local legislators had their duties, in giving them such facilities as would make it possible for them to provide for their communities the advantages that undoubtedly lay in the use of gas. To his mind, Dunfermline occupied a somewhat unique position, inasmuch as, having what might be called a treasury without any bottom, it was to be expected that, so far as the use of gas was concerned, they would take a step forward, and in some measure increase its use for heating purposes. They all knew the possibilities there were with coal gas; and he was sure they might look to the Corporation of Dunfermline to do their utmost for their gas undertaking, and for helping forward the desire of their own Manager, by giving him all the facilities possible in his work. As gas managers, and as members of the Association, they were delighted to know that their President occupied so satisfactory and so happy a position with his Town Council. It was twenty-one years since the last meeting of the Association took place in Dunfermline; and he had a personal recollection of it. There had been many changes since then; and to-day the town was in a somewhat different atmosphere. It was a seat of technical instruction; and he was sure that it would be looked upon as a place for the Association to meet in more frequently in the future than it had been.

Provost HUSBAND acknowledged the vote, and vacated the chair, which was taken by Mr. WADDELL.

PRESIDENT'S ADDRESS.

The PRESIDENT expressed the pleasure they had in having with them that day Mr. J. D. Smith, of Stirling, who had been appointed to the important position of Gas Engineer to the Corporation of Belfast. It was, he thought, a great honour to the Association that a Past-President should be asked to fill so exalted a situation. They all knew Mr. Smith's qualities, as a gentleman and as a gas engineer. He was sure Mr. Smith did not wish that this should be expatiated upon; but they were all pleased at his success. They had letters of apology for absence from, among others, Mr. W. Doig Gibb, of the South Metropolitan Gas Company; Mr. J. W. Helps, Past-President of the Institution of Gas Engineers; Mr. Thomas H. Duxbury, Past-President of the North of England Gas Managers' Association; Mr. R. G. Shadbolt, of Grantham; Mr. David Terrace, of Middlesbrough; Mr. W. R. Herring, of Edinburgh; Mr. Joseph Hepworth, of Edinburgh; and Mr. T. Wilson, of Coatbridge. He had almost overlooked the fact that they had also with them that day Mr. Alexander Wilson, of Glasgow, who they were all proud to think occupied the position of President of the Institution of Gas Engineers. Mr. Wilson was one of those who had given the Association a great deal of attention; and they were indebted to him for his assistance and support. The President then proceeded to deliver the following

PRESIDENTIAL ADDRESS.

Gentlemen, my first duty is to thank you most heartily for the honour you have conferred on me by electing me as your President for this year. I appreciate the honour most highly; while at the same time I am conscious of my inability to discharge the important duties which will devolve upon me. I trust, however, I may have your indulgence and assistance in making this year's meeting a success.

NATIONAL AND OTHER LOSSES.

The first place in our thoughts to-day in opening our annual meeting is naturally given to the shadow which still lies heavy on our hearts through the national, and, may I say, personal, loss occasioned by the death of our late beloved King. Well may he be called "Edward the Peacemaker."

Death, whose scythe is never at rest, has been at work in our ranks, and removed at intervals during the past year from our list of members Messrs. John Ireland, of Tayport, James Baxter, of Forfar, James Manwell, of Glasgow, Robert Sharpe, of Belfast, and Alexander Bell, late of Dalkeith. Mr. Sharpe was not only a gas engineer, but a civil engineer of considerable experience, and had, especially during later days, great responsibilities. Those who attended the early meetings of the North British Association, while it was still in its infancy, will remember with pleasure the regular presence of Mr. Ireland, of Tayport; and to them, his absence from among us to-day must emphasize the passing away of another old associate.

Only a few weeks ago, the gas profession was startled by the intimation that Mr. Alexander Bell was no more. The stages of Mr. Bell's working career have no doubt been read by all in the Gas Journals; and I would refer more particularly to-day to those ties which bound him to this Association. I am sure there are few here now, young or old, who did not know Mr. Bell. As a man, he was lovable and loved by all who knew him. His reputation as a gas manager was great; and he was always willing to give a helping hand to those who required it. Along with a few others, Mr. Bell met in Edinburgh, in 1861 or 1862, to form an Association, which afterwards combined with the present one. Of the present Association he was an honoured member; contributing from time to time valuable papers to the meetings. In 1897, he was elected President; and last year, on his retirement from Dalkeith, was appointed an honorary member. Mr. Bell was a life-long friend of the late William Young; and in his early days he attended science classes held by William Young's father. He was a keen and interested worker, seeking to learn in the hard school of experience something new—a man of strong character and active mind. To those who knew him well, Mr. Bell stands out as one who tarried not with trifles, but ever pushed forward in search of something real and lasting. It was the wish of many that Mr. Bell might have, after his strenuous life, some years of peace and retirement by the side of his beloved Tweed. But it was not to be; for his mind was too active to permit complete rest while here. His character and life are engraven on the annals of the gas industry in deep, bold letters, which even time will find it hard to rub out. I am sure I express the feelings of all here when I say that our sympathies go out to-day to the bereaved friends of our late members.

THE WILLIAM YOUNG MEMORIAL FUND.

At last year's meeting, it was remitted to the Council to decide what could be done to commemorate the life of the late Mr. William Young. The Council's proposal is a very satisfactory one, as is also the amount contributed. To-day it amounts to about £460—outside of what it is proposed that this Association is to give. This is a very satisfactory sum. Mr. Young's membership, and his contribution of a series of brilliant papers dealing

with matters lying at the very heart of our interests, added much to the status of this Association. We looked to him for papers which, I believe, no other man could give. He was a man who had an opportunity in a new industry; and he the man. His natural gifts were rare, and he developed and polished these gifts to a wonderful degree—constantly bringing the products before this Association. Apart from our great feeling of appreciation of him, it was an urgent matter on our part to have the man and his work emblazoned on our transactions as a watchword—a great example. At the same time, the proposal made and carried by us to-day is a rare opportunity for our Research Fund producing, so to speak, immensely more light than ever before, and thereby make up, as far as possible, for the loss of the great man to our Association, to the gas industry, and to the world. As one who served under his almost equally clever father, and shared Mr. Young's friendship and acquaintance—and although in my regards for the deceased I would not care to take second place to anyone—I have to confess utter inability to do justice to his memory or his life's work to-day. The occasion is great; and I am unequal to it.

Mr. Young was singularly fortunate as regards the breadth of his experience, which embraced both the gas industry and the shale-oil industry. He was born at Selkirk 69 years ago; and was the son of Mr. John Young, the manager of the gas-works there. Mr. Young, senior, had considerable practice as a consulting gas engineer, and was in great demand as a lecturer on physical and chemical subjects. His lectures were usually illustrated by experiments, in the preparation of which William Young frequently aided his father; so that he early absorbed the elements of chemistry. Breathing the air of a gas-works from his earliest days and during all the receptive period of youth, his nature was amid surroundings that tended to give his mind that bent towards the study of problems relating to gas supply which he manifested to the last. He was placed by his father as apprentice to the plumbing and gas-fitting trade in Dalkeith; and the journeyman with whom he worked was the late Mr. Alexander Bell. From then until the time of his death these two men were firm friends; and the fortunes of the Young and Bell families have since been linked together in a way which makes it impossible to treat of the one without bringing in the other.

In 1863, Mr. Young was appointed as manager of the Lasswade Gas-Works—here succeeding his friend Mr. Bell. His restless genius soon led to the termination of his career as a gas manager, and turned him on to the oil industry, in which he did long and distinguished service. While still at Lasswade, he made the acquaintance of shale, which was being brought from one of the neighbouring coal pits and tipped away as waste. He was not long in getting oil and gas from this shale; and he became in time the saviour of the oil industry. Some 40 years ago, the first of the long series of patents associated with the name of Mr. Young was taken out in connection with the distillation of shale; and soon after he joined the firm of the Straiton Oil-Works, Edinburgh, where he erected distilling and refining plant. In 1873, he transferred his services to the Clippens Oil Company, near Paisley. All this time he was busy making improvements and discoveries, and taking out a large number of patents.

Mr. Young's name is largely associated with the introduction of vertical retorts, which were used at the Scottish shale-oil works with great success; and a year before his death he contributed to the pages of the "JOURNAL OF GAS LIGHTING" a series of able articles on these retorts. At the time of his death, a detailed history of his life and work appeared in the pages of the "JOURNAL OF GAS LIGHTING" and "Gas World;" and to these able articles and their writers I wish to express my indebtedness. In 1885, Mr. Young retired from active management, and became a consulting chemical engineer, resident in Peebles, and latterly also at his estate at Harehope.

Technically, it might be said that Mr. Young throughout the greater part of his active life was a shale-oil engineer and not a gas engineer; but he never ceased to regard himself as a gas engineer, nor did the gas profession in Scotland cease to look upon him as one of themselves. On the contrary, his advice was continually sought in regard to questions of gas manufacture; and he continually, in turn, made gas experience throw light upon the shale-oil manufacture, and shale-oil experience throw light on gas manufacture. Perhaps never will the gas industry or the oil industry, or both combined, give scope to any one man to work out such a consecutive series of problems as those to which Mr. Young devoted his life energies. Details may remain to be filled in; but the principles are established, and whatever alterations and modifications the future may see, the part that was taken by William Young can never be forgotton in the annals of these branches of technology, nor can the example of the man and his work be forgotten. It will be for him an imperishable memorial in the ages to come; for by his own work he left the world better than he found it. And the glory of that cannot fade away.

Mr. Young as a personality was great. The man in the street could see that he was no common-place individual, and no one could speak to him without feeling that his way through life was off the beaten track—that Nature was his guide, his friend, and he with a simple directness was following with all the power of purpose which was strong within him. This manner was his to the last, despite his health, which during the later years of his life was much impaired. Those who had the fortune to know Mr. Young in the early eighties, will perhaps recall his striking figure—tall, erect, and full of purpose, with fingers combing his massive steel grey uprising hair to secure a momentary opportunity to complete a thought; his square brow; long, dark brown beard; and sharp but kindly eyes, capable of keen scrutiny but a friendly willingness to see all the good within the observed. He gave a careful hearing to ideas for improvement from the youngest of truth seekers, talked freely and encouragingly with them, and when a new and interesting topic arose, it was a pleasure to hear him expound his thoughts, and note the way in which he became animated and absorbed in the conversation, and set forth the point under discussion, while his eyes flashed, and at times lost themselves in his abstract thoughtfulness, which made a listener remember well the occasion. He did not please for the sake of pleasing; he did not patronize. He sought for truth, gave you a firm hand grip, made you welcome, and was unsparing in practical kindness. A visit to him made the day one to be remembered in your life. He was fond of the open air, fishing on the banks of the Tweed. He loved to watch the fish in the stream and think out his problems.

Mr. Young never posed as a theorist. His mind was charged with practical knowledge. He had an unusual faculty of observation; and these he used, together with his experience, to solve the problems which were ever occupying his mind. He did not make wild guesses at just everything that came in his way, but marshalled his existing knowledge, thought it well out, weighed it in the balance, and applied it to his particular problem. He lived among his atoms and hydrocarbon molecules, knew them as personal friends, and just how they would behave in certain circumstances—indeed, so well that his scientific imagination could suggest to him their behaviour in given circumstances and enable him to head them off from what would have meant disaster. It was his actual assimilated knowledge of the realities of things which had developed to an extraordinary degree this scientific imagination which Mr. Young possessed, and which, in his case, grew riper and more abundant with time. He was never content with what was, but whatever he touched he tried to improve, seeking for the foundation truths underlying all phenomena, and welcoming the newer conceptions of the nature of matter with unmeasured satisfaction.

Modest as he was about recording his observations and his thoughts, his earlier papers were simple to almost a fault. But in them lay the germ of his future work—they were but the forerunners of more brilliant ones which followed. He favoured this Association with many valuable papers; and from the storehouse of his wisdom, the Gas Journals have succeeded in rescuing much that has adorned their pages and enhanced our knowledge. Surely, when he came among us as a friend, as one of ourselves, and benefited so greatly this Association, unworthy would we be did we not in some way commemorate his name. And in what more suitable way could we do it than that proposed?

THE VITALITY OF THE GAS INDUSTRY.

Mr. J. W. Helps, in his able address to the Institution of Gas Engineers in June, felt it was impossible to say anything new on matters connected with the engineering side of our industry, on account of all that had been said and written in our Gas Journals from time to time, as records of the ever increasing number of Gas Associations and gas interests throughout the world. Surely we could have no better indication of the vitality of our industry. He confined his address principally to consideration of certain points upon the true appreciation of which depends the extent to which there are to be engineering matters to interest our profession in the future. These points he brought forward so well and so fully that they, in turn, are consequently no longer new.

CARBONIZATION QUESTIONS.

Carbonization of coal in completely filled retorts, in contradistinction to free space retorts, is almost universally admitted to have brought us the opportunity to secure great improvement in gaseous and solid products. Whether the retorts to be used should be verticals, chambers, or present retorts is not altogether such an easy matter to decide, because circumstances in this, as in many other things, considerably affect the question—viz., having found coal capable of yielding the most suitable products, what form of retort will most improve these—whether the improvement in products with lessened cost of labour will justify the throwing aside of present plant and the cost of erecting new? When, however, new or additional carbonizing plant is required, the well-established claims of vertical retorts as yielding such important improvements, both in products and labour costs, also the almost entire avoidance of the smoke and dust nuisance and of gas lost during the charges, demand serious consideration for the adoption of verticals.

The intermittent type of verticals, carbonizing about one ton of coal per day, necessitates comparatively frequent charging and discharging; and the men's work is not quite so pleasant as with continuous carbonizing types.

The continuous or the continuous-intermittent type of verticals, carbonizing about 2½ tons of coal per day, require fewer retorts and fittings per ton of coal than the intermittent type. They are thus simpler; while the labour of charging and discharging is easier. Some of these are very like the shale-oil retorts, differing only in the means of feeding the coal into, and the demission of the coke from, them. The portion of the coal in these retorts where coalescence reaches a certain stage is subject to form arches from side to side of the retort, which uphold the superimposed coal. The feeding door is comparatively simple, and, not

being subject to great heat, should be easily kept in good working order. The door of the bottom opening, if made of machine-faced iron, is subject to be warped, twisted, or broken by the heat to which it is exposed. When the opening is closed by a water-seal, this is constantly being evaporated into the retort, with doubtful results, and when unsealed loss of gas takes place. These are minor defects which are receiving consideration.

It is noteworthy that no conclusive explanation of chemical or physical changes within the retort have been given to explain the improved results. Dr. Colman put forward that the steam formed from the coal in carbonization is decomposed to a greater extent with the full charge than when a large, free space is left in the retort. The theory, on first blush, seems feasible, till Mr. Charles Hunt points out that, with a full retort, a larger quantity of virgin liquor is obtained. Under these circumstances, what becomes of Dr. Colman's theory? Mr. Hunt rather thinks the increased yield of calorific power gas, and gas without its power seriously if at all degraded, is due to the fact that the bulk of gas, through the reduction of temperature in the retorts brought about by heavy or full charges and the considerable or entire elimination of the free space, meets with a lower temperature, and so is not decomposed. The reduced carbon on the retorts in which heavy charges are used, indicates that Mr. Hunt is on the right track. Weight of opinion is therefore rather against the theory of Dr. Colman, although no one except Mr. Hunt has ventured to deny the accuracy of his deduction from mental consideration rather than actual working. It is surely possible to determine the cause of the increased results under present circumstances; and no doubt men of research will have this seen to.

It is interesting, in view of the improved gaseous results being now obtained from vertical retorts, to recall previous repeated trials over 35 years, on a comparatively large scale with similar retorts, when the results were disappointing and unremunerative; further, that the shale-oil works, up to 20 years ago, used horizontals, but then tried verticals. Since then the yield of gas has been greatly diminished, and that of oil increased. These results have, no doubt, unfavourably influenced the adoption of verticals for gas making, and prove that they have to be worked under certain conditions to meet our requirements; and no doubt our conditions of gas supply, in Scotland at least, are more favourable now for the use of these retorts than when cannel or shaley coal was employed for gas-making purposes.

COAL AND COKE PLANT, INCLUDING OVERHEAD HOPPERS.

Eight years ago, when Dunfermline put down coal and coke handling plant, it was believed difficult to do so in such a way as would pay in our works, because the erection of plant to convey coal from the trucks to hoppers over the retorts and throughout the coal-store, also to lift the coal from store to overhead coal-hoppers, and, again, to deliver coke in the yard and from the yard over screens into waggons or carts, and to deliver the breeze into the yard or in front of steam-boilers, would be too great a cost for the work we had to do. This was on the assumption that bucket, push-plate, or other mechanical conveyors would be used. Instead of these, a light underground and overhead railway, with hydraulic hoist system, was put down, and has been doing all the above work since then in a most satisfactory way. It was designed to handle the coal and coke from retorting plant which might afterwards be erected; and this it is capable of doing for any of the present systems of retorts. Without going into the many sides of the question, I may state, as an instance, that with our plant one man can with ease take from the waggons and put into the hopper above the retorts, day after day, and weeks on end, 80 tons during his shift.

The coke-hopper (to hold 250 tons) erected over our railway siding [see "JOURNAL" for April 12, p. 113] is capable of delivering coke into waggons standing on either of two different lines of rails. The reason for erecting this was that the railway siding accommodation was limited, and the service in railway waggons irregular. Yet with short notice, large quantities had to be filled from store and sent away for shipment. In designing this hopper, it had to be made next to impossible for a fire to occur in it; and the danger of this occurring through imperfect quenching is removed by the coke first falling into cylindrical quenching vessels with an opening in the side placed directly under the retorts. The opening is turned up to receive the hot coke from the retorts. While the coke is falling into the vessel, water is sprayed on it, and thereafter is evaporated by the partially quenched coke. The coke is therefore mostly quenched by dense steam, and the atmosphere is kept from entering the only opening at the top by the outgoing vapour. This atmosphere of steam or vapour has proved itself a thoroughly reliable quencher, if given reasonable time. Rekindling within the vessel never does occur, and rarely afterwards.

The coke is dropped from this into a small truck underneath. Thence it is taken by hoist and passed over the screen so as to remove breeze. The screen at the same time would separate any red-hot pieces that might come from any particular portion of the truck—thus lessening their chance of re-igniting. After this, however, when dropped from the tail of the screen, the coke falls alternately into vessels, where the exhaust steam from the engine driving the screen passes through, full of coke, while it is being filled, and *vice versâ*—ensuring complete quenching. Since there is a distance of 36 feet from the vessels to the floor of the hopper, means of letting the screened coke down gently is obviously necessary, and is arranged for.

This form of shoot was previously designed to bring about the same conditions as exist on a bing—say, of coke—where each quantity deposited at the top does not run down at such a rapid rate as in a metal shoot, and is not, therefore, subject to be so suddenly stopped and broken. The shoot, however, improves these conditions, because the small heaps formed on each ledge, so to speak, are not subject to rushes of large and heavy quantities as on a large bing with corresponding friction; and the drop of so many inches from the one small heap to another causes the coke to stop, as it were, on each small heap, and it avoids the tendency for it to increase in velocity in its downward passage, such as takes place in an iron shoot. The small drop also allows for any difference of the angle of repose of the coke on the small heaps, owing to increased or decreased size or the condition of the coke from time to time.

We will be able to run the 250 tons of coke from this hopper into waggons in three hours. The screenings from the coke as made from day to day will be run into small trucks and delivered in front of the steam-boilers. The use of this hopper will, therefore, avoid the carrying of the coke from the yard to the screen, as the coke will be taken direct from the retorts and screened into the overhead dish. This will give a regular daily supply of breeze to raise steam, and avoid laying large quantities of it aside and then returning it to the boilers.

The cost of the extension of the hoist and overhead railway, the hopper screen, &c., was £1000. Interest on this at 4 per cent., and sinking fund at 2½ per cent., amount to £59—equal to 2·36d. per ton of coke on the 6000 tons to be shipped per annum.

For shipping traffic like ours, the hopper offers the following advantages: It avoids one handling of (say) 5000 tons of coke per annum. It avoids two handlings of (say) 360 tons of breeze per annum. It also saves the cost of extending the railway siding. It will save the calling of men from other work to fill a cargo of coke for vessels—indeed, it will frequently enable us to wait till the vessels are berthed before loading waggons, thereby avoiding both waggon and vessel demurrage.

HIGH-PRESSURE GAS SUPPLY.

The increasing tendency to centralize the manufacture of gas in large works and absorb outlying districts and villages has involved sending gas much greater distances than formerly. Moreover, incandescent lighting demands generally higher pressures being carried throughout lighting areas; and where the carrying capacity of the original trunk mains has, through increased consumption, become inadequate, boosting in varying degrees has been widely adopted. Gas transmission by the high-pressure system has proved a valuable and economical supplement to the ordinary transmission from the holder; the distinct features being elasticity of output, greater control over the amount and constancy of pressure, and substantial reduction in outlay. While local conditions must be studied closely before deciding as to what degree and form the high-pressure transmission or boosting shall take, it may be agreed that the system commends itself for the following conditions:

1.—Where it is required to couple-up gas-works whose areas of supply adjoin; making one manufacturing and one distributing station respectively.

2.—For sending a supply of gas to outlying villages or distant holders.

3.—Raising pressure in distributing mains in a district.

The various forms of high-pressure systems to meet the above conditions may be:

1.—A high-pressure pipe-line, with reducing governors on the inlet to the low-pressure pipe.

2.—A high-pressure pipe-line with return type method of regulating the rate of compressor to give a constant pressure of gas at any predetermined point independent of the consumption, thereby avoiding excess pumping.

The different types of compressors may be taken as: Rotary type, suited to pump up to 10 lbs. per square inch at medium cost. Positive type, suitable for the highest range of pressure, but costing overmuch for pressures under 10 lbs. per square inch. Fan type, suitable for low pressures.

SUFFICIENT AND UNIFORM PRESSURE.

Having laid a high-pressure supply pipe to one village two miles distant, and another one mile immediately beyond this, independent supplies were taken off this pipe for the various streets through which it passed—the supplies being governed to 4½-inch pressures in each street. The consumers adopted the inverted burners suited for these pressures; and the result has been exceedingly satisfactory to all concerned. Tests made show that, with the usual meters, pipes, and fittings, a wonderfully uniform and sufficient pressure is maintained at the inlet of all burners; and I need not mention the advantage this is to consumers.

Gas suppliers have always known that their consumers suffer much through want of pressure at their burners; and the question may be asked: Have they done what they could to rectify this? I am inclined to think, at least since the advent of incandescent burners, they have not given the matter the consideration it demands, and have excused themselves by saying that they are not responsible for consumers' fittings. While I cannot recommend that suppliers should accept this responsibility, I have no hesitation in saying they should look to maintaining a sufficient and, as near as possible, uniform pressure of about 4½ inches within their street mains; and I am satisfied this would remove at least 90 per cent. of the complaints.

AUTOMATIC LIGHTING.

I am sure we feel indebted to those who have made, and are making, and improving, automatic lighting apparatus, whether for inside or street lighting. Such apparatus has already been made which justifies its adoption in certain circumstances; and I venture to say that it will not be very long before street lamps generally will be lighted and extinguished without having to send a man round to do it—and this without bye-passes burning during the day. The feasibility now being proved in a practical way, the proportionate improvement being great, and the work to be done sufficient to make a good trade, under these circumstances no doubt this will be accomplished. To light street lamps automatically will have a pleasing effect on the lighting authorities, apart from the saving and convenience it will bring.

PROGRESS ALL ALONG THE LINE.

Progress with improvement is an absolute necessity which, as time advances, gas engineers feel pressing more and more upon them. We are fortunate that in the past this work has been done, according to the times, perhaps a little slowly, yet in a way which has left to us a steadily increasing business. Within more recent years, the rate has been accelerated; and now, with the Livesey Memorial Fund, the Research Funds of the various Gas Associations, together with the work done by gas companies, corporations, and their staffs, also the very determined efforts made in this direction by manufacturers, apart from individual effort—which is perhaps the greatest element in the struggle—and considering the progress made, it may be said that the industry never had better prospects of rendering greater service to the public. I venture to say we feel that we are in the hum of it.

The makers and suppliers of gas to the public are the parties who are brought most closely into contact with the need for improvement in the various departments. The workers in each works should be encouraged to seek for what should be improved; and this need will "stimulate the doing of it." Let a few engineers and managers of neighbouring works meet to discuss such needs, and how to meet them. From such meetings it may be assumed that valuable results would flow, as they would prompt and develop the mind in its constructive or rock-bottom, truth-seeking faculties. It does not follow, however, that a number of men, even of an inventive turn of mind, could always be expected to work together to reason out a problem to an extent leading at the moment to any real invention, as each mind finds it own way to the solution of a problem to solve which one is often at least unaware of any known laws. He has to be content with seeking for a truth which almost always appears at first in an indistinct and misty way in his mind, and the clearing up of the mistiness and the strengthening of his hold on the truth frequently reveal the tit-bit of the invention.

Mr. G. KEILLOR (Broughty Ferry) proposed a vote of thanks to the President for his address. As a member of the Council, he said he could assure those present that Mr. Waddell had devoted himself with zeal and assiduity to the varied, interesting, and important work of the Association. He was sure the other members of the Council would agree with him when he said that during his year of office Mr. Waddell had directed their business affairs with uncommon skill and general acceptance. The interesting and informative address he had delivered was characteristic of the man and his methods.

The vote having been heartily accorded,

The PRESIDENT briefly returned thanks.

REPORT OF THE COUNCIL.

The report of the Council was then presented, as follows:—

The Council presented a report on the work and progress of the Association for the year 1909-10. In the course of it they pointed out that the membership of the Association at the end of last year was 273, as compared with 248 at the close of the previous year—an increase of 25. The membership is made up as follows:—

Ordinary members	173
Associate members	13
Extraordinary members	81
Honorary members	6
	273

The Council recorded that the following members have ceased, by resignation or otherwise, to be connected with the Association:—

Baxter, James, Forfar, deceased.
Bell, Alexander, Dalkeith, deceased.
Cuthbertson, Thomas, Neilston, resigned.
Galbraith, William, Ardrossan, resigned.
Gibson, John, Kirkcudbright, resigned.
Ireland, John, Tayport, deceased.
Irvine, David, Fauldhouse, resigned.
Manwell, James, Glasgow, deceased.
Marshall, William, Largs, resigned.
Sharp, Robert, Belfast, deceased.

In accordance with the rules, the Council recommended the following for membership:—

Ordinary Members.

Chalmers, Robert B., Gas-Works, Alva.
Grafton, Walter, Assistant Gas Engineer, Glasgow.
*Leckie, Robert B., Manager, Gas-Works, Holytown.
*Rule, Henry, Manager, Gas-Works, Kelty.
Scott, Walter C., Manager, Gas-Works, Markinch.
Winton, Charles, Manager, Gas-Works, Grangemouth.

[*Transferred from Associate Membership.]

Associate Member.

Robertson, Robert D., Gas-Works, Airdrie.

COMMERCIAL SECTIONS.

The Council have received reports from the Western and North-Eastern Sections recording the success of the past year's work. Numerous meetings have been held in various parts of the country, and such varied subjects as coal and residual products prices, income-tax depreciation, demurrage charges on railway waggons, the price of gas-meters, insurance, &c., have been discussed with advantageous results. It is admitted that the Commercial Sections have fully justified their existence, although much still remains to be done to link-up various outstanding technical and commercial interests.

WILLIAM YOUNG MEMORIAL.

Last year an attempt was made to publish, in book form, all the technical papers and articles contributed to various Societies by the late William Young; but the scheme had to be abandoned owing to the prohibitive cost of such an undertaking. The members of the Association, however, being desirous of doing something to perpetuate the memory of his life and work, remitted the matter to the Council for further consideration. A meeting was duly convened; and a Special Committee was appointed to deal with the matter. The Committee ultimately resolved to invite subscriptions to a fund, to be called "The William Young Memorial Lectureship Fund," having for its object the provision of annual or biennial lectures at the meetings of this Association. The following is the report of this Special Committee:—

Report of Special Committee.

The Committee have devoted much time and attention to the consideration of this matter; and they are pleased to report that they have now arranged a scheme which, in their opinion, will admirably perpetuate the memory of the late Mr. Young. Several suggestions were made to the Committee, and these having been carefully considered, it was unanimously decided that the memorial would take the form of a fund to be called "The William Young Memorial Lectureship Fund," the income of which should be devoted to providing a biennial lecture to be delivered at the general meeting of the Association. For this purpose it was estimated that a capital sum of £600 would be required. A circular inviting subscriptions was accordingly issued to every member of the Association and to their respective companies or corporations, and also to a few of Mr. Young's personal friends, and met with a generous response. Up to this date, the sum of £425 has been subscribed. The Committee have given instructions to have a Deed of Trust prepared, under which the fund will be permanently settled for the purpose for which it has been raised; and the subscribers will have an opportunity of considering the terms of that deed before it is executed.

The Council are of opinion that the proposed specially arranged lectures will be of inestimable value to the profession and to the gas consuming public; and they unanimously recommend that 100 guineas should be contributed from the research fund in aid of the scheme.

CHANGE OF DATE OF THE ANNUAL GENERAL MEETING.

From reports which reach us, the Committee conclude, it is evident that the month of July is not now an altogether suitable time for the annual general meeting of the Association. We are well aware that July is a regular holiday month; and many experienced members, on holiday at the time, find it inconvenient to break into their well-earned period of repose for the purpose of attending the annual general meeting. It is further suggested that our July meeting comes too soon after the Institution meeting in June, and the Informal Meeting held earlier in the year. Besides, in between, there are now the frequent meetings of the various Commercial Sections, which give members so much additional opportunity for note-comparing, and for the personal interchange of ideas. This proposal has received the attention of the Council for some considerable time; and they strongly recommend the members to agree to the date of the annual general meeting being changed from July to early in September.

The PRESIDENT said the matter relating to the William Young Memorial was rather interesting; and the Council would be very pleased to hear what the members might have to say on the subject.

Mr. J. NAPIER MYERS (Saltcoats) said that there was one slight alteration that might be made in the report. It must, he thought, be an omission that the name of Mr. Bell, of Peebles, was not mentioned. It should have been stated that Mr. Bell had been authorized to receive subscriptions. He had no doubt that the personality of Mr. Bell had a great deal to do with the success which had been attained in raising the required money.

The PRESIDENT said Mr. Myers quite expressed the opinion of the Council. He considered that Mr. Bell had been the right man in the right place; and there would be no objection to his name being inserted in the report as suggested. As to the proposal to change the date of the meeting, he thought they should at any rate give it a trial. It did not follow that the alteration would be a permanent one. The Council were of opinion that it would be a wise thing to change the date. He moved that the report be adopted.

Mr. J. W. NAPIER proposed that it be an instruction to the Council to arrange for the annual meetings being in future held in September.

Mr. A. MACKAY (Montrose) seconded; and the proposition was agreed to.

The report was then adopted.

FINANCES OF THE ASSOCIATION.

In the statement of accounts prepared by the Auditor (Mr. David Spalding, F.S.A.A., of Glasgow), it was shown that the General Fund amounted to £266, and that there was £136 on hand; that the Benevolent Fund had been drawn upon during

the year to the amount of £40, and that there remained a balance of £500; and that the Research Fund amounted to £156.

Mr. ALLAN REID (Brechin) moved the adoption of the statement of accounts. He said it was a very satisfactory one, as they were in the position of having more money at the credit of the Association than ever before.

Mr. A. WILSON seconded the motion. He said he considered the Secretary and Treasurer and the Council deserved the greatest thanks from all the members for the excellent way in which they had managed the financial affairs of the Association. The accounts were about the most satisfactory he had ever seen presented to any Association. Mr. Hislop had put their finances into such a condition that they were not only a credit to him, but would enable the Association to pay over £100 from the Research Fund for the Young Memorial Lecture. This would be really good work. It would be putting the money to a purpose where it would be of the utmost service, not only to the members but also to the gas industry.

The motion was agreed to.

Mr. S. MILNE (Aberdeen) moved that the Association vote 100 guineas from the Research Fund to the Young Memorial Fund. He said he was not aware of much having been done with the fund by way of research, except in connection with the Livesey Memorial; and he considered this was an opportune moment for disbursing as proposed.

Mr. G. KEILLOR seconded; and the motion was agreed to.

READING OF PAPERS.

The two papers on the programme—one by Mr. J. W. Napier, of Alloa, on "Gaseous Fuel: The Duty of Gas Supply Authorities to the Public;" and the other by Mr. J. Dickson, of Forfar, on "The Checking of Working Costs in Small Gas-Works"—were then read. The former is given, with the report of the discussion upon it, to-day; the latter is unavoidably held over till next week.

LUNCHEON BY THE CORPORATION.

At the mid-day interval, the members and their lady friends were entertained at luncheon in the Burgh Court Room. Mr. T. STEWART presided, and extended a cordial welcome to the Association, whose work he highly commended.

Mr. A. WILSON (Glasgow) proposed a vote of thanks to the Corporation for their kindness and hospitality; and it was cordially agreed to.

ELECTION OF OFFICE-BEARERS.

As the result of the ballot, the following were elected office-bearers for the year:—

President.—Mr. G. Keillor, of Broughty Ferry.
Vice-President.—Mr. J. M'Leod, of Greenock.*
Members of Committee.—Mr. A. Bell, of Peebles, and Mr. A. Smith, of Tradeston, Glasgow.
Auditor.—Mr. D. Spalding, F.S.A.A., of Glasgow.

Mr. KEILLOR returned thanks for his election as President—an honour which, he said, had come to him a good deal before his time.

PLACE OF NEXT MEETING.

The PRESIDENT moved that the meeting next year be held in Glasgow; and this was agreed to.

Mr. KEILLOR said he would certainly have liked very much if the Association could have gone to Broughty Ferry. It was a long time since they had been in the neighbourhood; but he felt that, there being an exhibition in Glasgow next year, this fact must weigh with the members in deciding as to the place of meeting.

CONCLUDING PROCEEDINGS.

Mr. J. D. SMITH presented the President's Medal to Mr. Waddell, who accepted it and briefly returned thanks.

On the motion of Mr. J. D. SMITH, the readers of papers were thanked for their contributions.

This completed the business; and the meeting came to a close before four o'clock.

VISIT TO PITTENCRIEFF GLEN, ANNUAL DINNER, AND EXCURSION.

The members and lady friends were photographed in the Abbey grounds, and then passed into Pittencrieff Glen, the gift to the town of Mr. Andrew Carnegie, where they were entertained at tea, with music for an hour. A ramble in the romantic glen was somewhat spoiled by showery weather.

In the evening the annual dinner was held in the City Hotel.

On Friday a large party of ladies and gentlemen went upon an excursion in brakes from Dunfermline to Kinross, driving round Loch Leven. Lunch was served in the Green Hotel at Kinross.

* Mr. M'Leod and Mr. A. Reid, of Forfar, received equal votes. In terms of the rules of the Association, the President drew lots; and the lot fell upon Mr. M'Leod, who was declared elected.

Japan-British Exhibition Awards.—In the "JOURNAL" for the 19th ult. (p. 177), we mentioned some of the recipients of awards at the Japan-British Exhibition. The following are additions to the list: A grand prize to the Thames Ironworks, Shipbuilding, and Engineering Company, Limited; a gold medal to Messrs. Clayton, Son, and Co., Limited; silver medals to Messrs. Head, Wrightson, and Co., Limited, and Messrs. W. C. Holmes and Co., Limited; and a diploma of honour to the Brentford Gas Company, for their installation of high-pressure gas.

GASEOUS FUEL: THE DUTY OF GAS SUPPLY AUTHORITIES TO THE PUBLIC.

By J. W. NAPIER, of Alloa.

[A Paper read before the North British Association, July 28.]

It is not the purpose of this contribution to discuss the efficiency of gas-fires as a heating agency. Much good work is already being actively engaged in by experts in our own profession, as also by the firms manufacturing the apparatus—the latter deserving grateful praise for introducing scientific investigation in the designing of their goods. Nor do I desire to touch upon the question of low-grade gas for heating. This is a technical matter which the public will be content to leave to the expert; and we, as responsible officials, will not fail to meet the case.

The necessity for a higher standard of efficiency of gas-fire, and also for improvement of design, we recognize as urgent. But while efficiency of the fire—*i.e.*, minimum consumption of gas consistent with satisfactory heating power—is required, and is a direct factor towards decreasing the cost to the consumer, the duty to the public is to provide apparatus under easy conditions of purchase or hire, and the supply of fuel at low rates. We must recognize that the public are quick to grasp opportunities of advantage and betterment. They are the judges; and it is they who decide.

If one is able to contemplate, far less to endeavour to measure-up, the vast possibilities of a fuel-gas scheme for domestic requirements in our cities and towns, we begin to realize that herein there exists a commercial asset of such practical value to gas undertakings, and of benefit to the public, that should at once stir up within us an immediate endeavour to win it. We become doubly conscious of how great the effort required must be in order to obtain the huge business of distributors of heat.

My anxiety, therefore, is (and it is the burden of my discourse) to discuss, and in some measure to indicate, the line of policy to be followed in giving to the public coal gas as the fuel that should be cheapest and best.

As distributors of gas for lighting purposes, the possibilities of adding to our business are becoming less year by year, as ground hitherto unappropriated has been gained; and the accustomed upward line of increase must needs be influenced by the agency of competition. The use of gas for cooking has been advanced to such an extent that in a number of towns it can be said that business has been almost fully absorbed; and, speaking generally, with the past years of education and facilities given to the public, this field also is fast being taken up.

Gas for power requirements has had to meet the stress of competition—for small power the electric motor, and for large power producer gas; and, while the demand must always be very great, it is only where low rates are offered that a satisfactory load-factor can be got and retained.

What I have here stated has been set forth as a calm, deliberate statement of our position as gas suppliers. The duty to ourselves is to keep the business we have by practical efficiency in the use of gas by the public, and, further, to endeavour to widen the field of our business, which, I feel assured, is not limited by any near margin of demand.

I have been led to make these observations, having in view my own circumstances at Alloa. When I find that nearly every householder cooks by gas, and that the average annual consumption per ordinary meter is 30,300 cubic feet, and the slot meter gives an average of 16,100 cubic feet per consumer, that we have no competition from suction gas with selling rates from 1s. 4d. to 1s. 10d. per 1000 cubic feet, and that we sell 16½ million cubic feet per annum for power and industrial purposes to 76 consumers, giving an average of 219,000 cubic feet per consumer, I find myself brought near to the critical point of saturation.

FIXING FREE.

To fix gas-fires and heating appliances free of cost to the consumer is a *desideratum*. We are aware that at the early stage, when gas cooking appliances were being introduced, this duty was the elementary guide to increase of business, and not to do so an error that short experience enabled us to eliminate.

The cost of the fixing is merely an outlay of a similar kind as in the case of a service-pipe for a new consumer, except that the lighting meter already fixed does double duty. Further, any single instance where the cost of fixing is excessive must not be used to condemn the policy; for it is necessary to consider the average cost of fixing over a large number.

The claim of the gas-fire should be recognized in the schedule of the architect; and, while this matter has been long spoken of, no general result has been arrived at. Once we have brought about the fixing of gas-pipes in new buildings during erection, a valuable concession will have been obtained in the way of gas-heating being given its just position. Is it not, therefore, clearly a duty of our Commercial Sections to collaborate with architects and builders?

Over a period of two years, I find the average cost of fixing of fires to be 7s. to 8s., which includes all time and material. This sum cannot be considered excessive; and, having regard to what is a possible average consumption of gas per fire fixed, it should establish the policy of fixing free. The cost of fixing as an item of expenditure should, in my opinion, be a charge against revenue, and not be included in the capital value of gas-fires as appearing in,

our books where the apparatus is hired out. The capital account would represent value of fires only, and would be written-off by the sum received for rentals or sale, as the practice may be.

I have thus referred to this important feature of my subject, because it is the prime essential; and I invite anyone to show cause or reason why this work should not be done or only carried out up to a predetermined cost—the consumer to meet the additional expense. I am aware that several large corporations are lamentably in the background in this matter; but then small movements of this kind are of curiously slow growth and issue. Necessity will, however, undoubtedly compel.

We recollect in the far-back annals of our industry the lightsome duty of gas departments in helping consumers of gas; the diligent individual in his anxiety to have "light without a wick" had to provide his own service-pipe and buy a meter for measurement. At the present moment, and as regards the fixing of heating apparatus, there is room for suspicion that the history of these past times is being practised once more. Let us try and be serious in being up-to-date in our methods.

A commercial business is generally found to be built up of units of different capacity and value; and we speak of the success or failure of a scheme of business by the result produced. Therefore, let the duty of supplying heating gas be administered while having in view a large volume of sale in the aggregate, but yielding, nevertheless, a satisfactory result.

Hiring-Out of Heating Appliances.

The resolve to fix free having been arrived at, we have next to consider the ways and means whereby the consumer is to be further encouraged. We immediately discern that the different classes of the general public are of varying moods in their ideas and of separate ability as to spending money on heating appliances. We have those who, having once resolved to use fires, buy the article outright; and they receive our encouragement. Generally speaking, however, the vast majority of the public are wishful of help in matters of finance; and the process of adding to our heating consumers will be greatly advanced by gas departments acting as lenders of money. Shortly stated, I am satisfied that when the policy pursued is that of supplying the consumer with the article wanted at a nominal rent, or on simple hire-purchase, a forward step has been taken. We do know from experience with cooking apparatus that any attempt to ask the consumer to buy the stove is like trying to do business but getting next to no result. It may be concluded, therefore, that to take up the attitude throughout of asking consumers to buy their heating apparatus is not likely to promote rapid progress—the pace will be much too slow. This, I am satisfied, has been the general experience.

But having considered the policy of hiring-out in its logical aspect, and determined its possibilities, and more particularly perhaps from the vantage point of the consumer, it is necessary to consider the position of the gas department in meeting the outlay incurred.

The question resolves itself into a matter of simple finance. Having incurred the outlay, the gas department desire a satisfactory return, and hence a system of rentals is instituted. The amount of rental charged should be based on a five years' (or, say, seven years') purchase of the article—the appliance to become the property of the consumer at the end of the period. The other method of simple hire could be based on a certain number of years' purchase of the fire; the consumer being entitled to return the article at any time desired. In this latter system, there exists undoubtedly a possible effect that is highly undesirable. A consumer—tired, it may be, of his experience, or wishful of having another design of fire—requests removal. Unwillingly we assent; but, if we are progressive, the returned article very soon finds another customer. Looking backward, and remembering our experience at Alloa of hired-out cookers, and the number returned during the out-of-season part of the year, the question instantly prompts itself: To what extent will this result with fires, &c.? If fires lent out on simple hire without conditions are returned to re-stock our show-rooms, then we must devise a system to prevent, or at least minimize, the trouble and loss. I am anxious to debate the subject in its practical aspect, and, having referred to this phase of the business, am willing to leave it at this stage. Actual experience may show results.

In deciding to put gas appliances on hire, we have to carefully consider how far it is advisable to go in the cost of the article hired. The policy at the outset would be the cautious one of putting on the hire-list only fires up to a certain net cost. What this might be precisely can very well be left to the individual concerned to determine. To adopt only a limited number of fires of different design will also be found desirable—thus eliminating the trouble of requiring to keep a large stock; and at the same time, having only a few different kinds, they are more easily disposed of if sent back by the consumer. As regards apparatus of high-class design and finish, that are costly, these are generally wanted by consumers who can afford to buy outright; and this arrangement is the best for the gas department.

Broadly speaking, therefore, it may be taken that the hiring-out of appliances under reasonable yet protective conditions provides a means of outlet for additional business, and on the hire-purchase system is financially sound. But, as I hope to show later, this method will still leave gas behind on the royal road to its ultimate general use for heating.

The policy of fixing free and supplying apparatus on hire at present rates, if persevered in, will enable us, in due course, to measure not only the progress made, but, be it now noted, its limiting effect also.

I have referred to the urgent necessity of affording to the consumer of gas for heating facilities for fixing free, and the acquirement of apparatus on easy terms, knowing that this has been the policy of a very large number of gas authorities throughout the country. But I desire to know something of the result, first, as to the extent the apparatus has been made use of and the number of fires returned, and to what extent the consumption of gas has been increased, and whether the fires can be termed intermittent consumers only.

I now come to discuss another phase of the business of selling gaseous fuel, and it is desired to take the opinion of the public. We shall be told that gas as a heating agent is too dear at present rates to permit of free and constant use. We make no complaint with the statement, knowing how well-founded it is. It is not sufficient to emphasize the advantages of gas heating as to cleanliness, convenience, adaptability, and so on, because the public will not thereby be prompted to the general use of gas to the exclusion of other fuels, when the actual result is found to be an increased fuel bill compared with what formerly obtained. It must be admitted at the same time that in very many instances, as a labour-saving appliance, the gas-fire will be adopted on its merits, and cost allowed to be of secondary consideration.

The facilities so afforded, as already described, are sufficient to justify gas authorities in stating that, for intermittent or occasional use, the gas-fire amply fulfils its duty in meeting the wants of the public. But we must not rest satisfied at this stage, because only a very small percentage amount of the present-day demand for heating requirements has been absorbed. Nor must we be unmindful of our competitors in the field. To have succeeded in introducing gas-fires that can only be used for short-hour periods is like picking up single straws when a whole field lies before us ungarnered.

At what price, therefore, must gas be supplied in order to compete with other fuels? Referring to the detailed and valuable report of the experts appointed by the Glasgow Corporation, Mr. F. W. Harris, Mr. Peter Fyfe, and Mr. Alexander Wilson,* it is stated that the total expenditure for a six-hours' trial was: For gas, 4·2912d.; for coal, 2·9062d.—equivalent to 1·385d. in favour of coal. "If the price of gas was 1s. 4d. per 1000 cubic feet, instead of 2s., the cost of the two fires would have been identical, with a manifest advantage for the gas-fire in rapid, even, and progressive heating power to the maximum, and instantaneous extinction when no longer required. But even with the extra 1⅓d., gas can claim, as we have already indicated, a convenience and simplicity of regulation impossible with coal; a rapidity of effect which coal-fires cannot attain to; and an absence of dirt and dust and ashes, which we think may easily compensate every cleanly housewife for the fractional saving she can make in money by burning coal." The report further states: "We are, therefore, of opinion that, even where fires are required for continuous daily use . . . the cost of heating by gas compares very favourably with the cost of heating by coal."

The data obtained are valuable; and, personally, I feel satisfied that the ratio of difference in price between gas and coal is most fairly stated. But it is this difference in cost that largely concerns the consumer; and he will not feel justified in using gas freely despite the many conveniences. Likewise, it is this difference in cost that concerns gas suppliers also.

It is to be noted that 1s. 4d. per 1000 cubic feet is the price at which it is necessary for gas to be supplied in order to compare with coal, taking simple cost only as the basis of calculation. If it is impossible at the present time—as undoubtedly it must be admitted to be the case with the large majority of gas supply concerns—that gas can be sold at anything approaching the price mentioned, then we must be content to provide every other possible facility to the consumer. Hence low rentals and fixing free can be persevered with.

The question has been put that, If we must differentiate between the prices of lighting, heating, and power gas, why not do so by providing the appliances free? This, I reply, is not enough. You may provide a magnificent system of railways and luxurious travelling compartments; but if the fares are high, the public will not travel in their crowds. Likewise you may provide the public with fires free of cost and fixed free; but if the running cost—viz., the price of fuel—is high, then the business done will be limited.

The possibility of a low price, however, is not exhausted. There are towns where a lighting rate of approximately 2s. is in force, and a rate of from 6d. to 8d. per 1000 cubic feet less is charged for gas for power and industrial purposes.

A Flat-Rate or Differential Charge?

I have now arrived at the crucial point of my subject, and an aspect of the whole matter which requires our careful deliberation. I refer to instituting a separate flat-rate, or charges on a differential scale, for gas used for heating purposes. The supply of gas at a special rate for heating requires that gas for cooking should be considered as coming within the compass of heating gas, and both demand treatment alike. Regarding gas used for cooking, let me remind you that the gas-cooker is the factor at work in providing gas-works with a summer load; and many of

* See "Journal" for Jan. 4 last, p. 39.

us can instance in our own experience cases where the day-load from 6 a.m. to 6 p.m. is 50, 60, and at times 70 per cent. of the total twenty-four hours output. To what then, in similar direction of use can we look, whereby a winter load for heating gas can be secured? Here, unquestionably, the gas-fire presents itself. We are aware, of course (and I do not overlook the fact), that a summer day-load is something of different value compared with a winter day-load, and that the time-period of the use of fires trespasses upon the hours of maximum demand for lighting during winter months.

The hour of maximum demand has been the bogey of electric engineers. A too closely practical and overstrained conception, in my opinion, has been given to it, though doubtless with our competitors it is a factor of much greater import than with gas suppliers. If we wish to place a watch upon users of gas-fires, and introduce conditions that may prove onerous, then we are placing a check upon our business. I believe, therefore, that this element of the case should be dropped. There are surely ways and means in our capacity as practical men whereby sudden overloads, so to speak, can be handled with success.

Are we, then, to leave the rate for gas for cooking alone, and consider that free fixing and free rentals abundantly satisfy the consumer, and that we as gas suppliers have practically a monopoly of the business? There is no serious competitor in the field; and, therefore, I am content to accept this dictum for the present time at least, but feeling certain, nevertheless, as to the ultimate result. There are aspects of our business that, having regard to the different uses of gas, and the necessity for special rates due to competition, and competition alone, are found difficult to deal with on a rational basis, and the present instance is an example. But I am disposed to believe that, while equitable treatment is highly desirable, the exigency of the case demands a departure from the guiding rule of simple principle. I, therefore, desire to state quite simply and openly that gas, if it is to be brought within the reach of the public as a fuel—to the general exclusion of all other competitors in the field, to be used freely and constantly—must be supplied at a special rate, and that this rate will meet with the approval of the public if charged at or about 1s. 6d. per 1000 cubic feet. We must modify our charges to suit our consumers; and no amount of strenuous endeavour in any other direction can meet the case.

Separate Departments Needed.

The course of events, therefore, may impel us to set up two different departments of sale of gas—viz., lighting gas and fuel gas—with separate rates and meters. The practicability of such a scheme, as affecting the working of our departments, demands further and closer examination. I am conscious that to do so with diligent regard to the importance of the matter, and to submit an analysis of the cost of gas production, is much more than can be expected of me on this occasion.

I have referred to a separate meter being necessary. It may here be stated that in the case of electricity a separate rate is in force for power and heat in almost every area of supply, and a second meter is used. An interesting aspect of the situation is that as loans are not usually granted to electricity companies for meters, the expense must be met from revenue. Our policy in fixing a separate meter will be justified if the business resulting is of satisfactory return in ratio to the expense incurred.

It is the presence of the coal-fire in the kitchen during the winter months that prevents the full use of the gas-cooker at that period. The public will not be a party to spend money in two directions at the same moment to serve one purpose only. Therefore, with gas at an economical price for heating, its use will be taken advantage of at all times and seasons, for cooking and heating both. In this regard we may remind ourselves that the volume of gas required per hour for heating appliances is very large, and generally from six to ten times more than is necessary for one single appliance for lighting. Surely this simple statement is sufficient to convince us in an elementary way of how much the consumption per meter can be "boosted-up," and of the enormous field at our command.

What will help us is, say, a three-light size of meter made equal to passing double the volume it is at present capable of, even if charged at only a slightly less price. I do not wish to labour this point; but what I do wish to say (and that merely in one word) is that a meter, correct in registration at the maximum and minimum demand, and less costly than the present instrument, is urgently wanted by the gas industry.

As an advocate of differential rates, I am strongly of opinion that, at the initial stage of our attempt to supply cheap heating gas, a scale of charges should be instituted based on consumption of gas. I find, in the case of my own town, that for the past year, with rates from 1s. 6d. to 2s. per 1000 cubic feet for power and industrial purposes, 16½ millions were sold; the average price obtained being 1s. 8½d. For the coming year, the rates have been reduced by 2d. per 1000 cubic feet; so that the average price to be received will probably be 1s. 6d.—the ordinary rate for lighting being 2s. 1d. The above-mentioned rates, however, only apply to large consumption, such as cannot be obtained from domestic use for heating. In the case of engines, we have to meet the expense of the service-pipe and the meter; with heating apparatus, the outlay for fixing and supply of meter has also to be incurred if a scheme of differential rates for heating is brought into practice. The essential difference, therefore, is the volume of business done.

If my own case is taken as typical, it will be noted that there is a difference between the lighting and power rates of 7d.—being 28 per cent. of a reduction. From the short study I have given to the matter, I would not be averse to attempting rates for heating of 1s. 9d. and 1s. 6d. per 1000 cubic feet, according to the quantity of gas consumed—the gas department to provide a second meter, fix all heating apparatus free, and give the consumer the choice of obtaining the latter on a hire-purchase scheme, or, if bought outright, at an absolute net cost.

I have endeavoured to summarize the subject in its general aspects; it is for each one to consider the matter according to his individual circumstances, and to determine what possibilities exist for increasing the sale of gas for heating in the area of supply. Whatever the future may hold in store for the gas industry, I feel satisfied that gaseous fuel will in very large measure be the medium of heat supply to the domestic public of the future, if we at this present stage of time exhibit a liberal spirit in the supply of our product.

Discussion.

The President said they had had a paper on one of the most important subjects relating to the supply of gas. Mr. Napier had treated it broadly, avoiding technicalities; and it would be useful to have a discussion upon the matter. They had with them Mr. Wilson, of Glasgow, who had had a great deal to do with the subject lately; and he would be pleased if Mr. Wilson would open the disoussion.

Mr. Alex. Wilson (Glasgow) thought that the Association were greatly indebted to Mr. Napier for bringing the subject before them at this time. It was getting to be one of the most pressing points in connection with their industry—the question of the supply of gas for domestic purposes. There was no doubt that there was an immense field before their industry in this line. The difficulty was to so arrange matters that they could take full advantage of the demand, and get the business before it was gathered up by some competitor. Mr. Napier had dealt with the subject fully. As the manager of a fairly large corporation gas undertaking, he might say corporations generally laboured under an immense disadvantage in competing for this kind of business, as compared with gas companies. However anxious managers of corporation gas undertakings might be to extend business in this direction, they met with many difficulties and discouragements. Councillors were only human beings after all; and when pressure was brought to bear on them by traders—plumbers, ironmongers, and others—he could quite well appreciate the difficulties of their position. They had no wish at all to hurt in any way traders who, without doubt, contributed largely to the success of a city or town by their energy in business; but those who were connected with the gas industry felt that traders did not give the same attention to their business which they could give themselves. If they had the full sympathy of their councillors and corporations at their back, in the same way that managers of gas companies had, and they were allowed a free hand, he had not the slightest doubt most of them could make this business boom in a short time. They had now come to the stage when they had apparatus that furnished very good results for the amount of gas consumed. Mr. Napier gave credit to makers of gas appliances for the interest they had taken in giving them good apparatus. He would like to add his voice to this. He thought they were indebted to the makers for the increasing interest they were taking in making their apparatus better and more efficient in every way. They might say it was their business to do so; but they felt that the interest of the makers in this way was not only to their own benefit, but also much to the benefit of every gas undertaking. Mr. Napier dealt with a great many points in his paper; but he (Mr. Wilson) would only touch upon a few of them. He dealt with the free fixing of apparatus. There was a good deal to be said for the free fixing of gas-fires. Consumers asked the price of a gas-fire, and very often were quite willing to pay it; but when they were told that fixing would cost so much extra, in many cases this was enough to scare them altogether away, which was a great pity. They had no hesitation whatever in putting in new services for all lighting consumers; and he thought that Mr. Napier was on the right lines when he suggested the free fixing of all gas apparatus. Perhaps they might not go the full length; but he believed that in the near future free fixing would be the rule, and not the exception. Most of them were desirous of getting extended power for the fixing of pipes in buildings. Glasgow was recently in Parliament, and had their powers extended in this respect; and he hoped that, by bringing pressure to bear on architects and others, they would be able to do much better in this respect than they had done. The difficulty in most buildings was to get a service suitable for gas-fires carried through in an efficient manner; the pipes often being small. When this was the case, a service had to be run from the meter to give an efficient supply. If the piping of buildings were done efficiently at first, this difficulty would not be met with; and the mere fact of having a connection at each fire-place, would do much to extend this business. Mr. Napier mentioned the figure of 7s. to 8s. for connecting each fire. He wished they could get down to this figure in Glasgow with safety. Then he said that all these charges were revenue charges, and only the fires were put to capital. This also, he thought, was on the right lines. They should not go on building up more capital than they could really help. The competition between gas and other methods of lighting and heating was getting keener every day; and the lower they could keep their capital charges, the better would they be

able to compete. The cost of the gas was a most important part of the problem. He must confess he was a little bit in doubt as to the advisability of reducing the price for heating—domestic heating especially. So far as gas for manufacturing purposes was concerned, the question was simple, because they could make gas for manufacturing, which was used practically regularly throughout the year, at a much lower rate than they could for (say) lighting purposes, which gas was only used for a short time in the winter. Gas for fires was much on the same lines as that for lighting—it was used only for a short time in winter. Therefore, it helped to build up what electricians called the peak-load. Gas for manufacturing only required about one-third of the plant in their works which gas for lighting did; and therefore the standing charges were borne much more easily in the case of gas for engines or manufacturing purposes than in that of gas for lighting or for fires. Consequently, he had not yet gone the length of Mr. Napier, in advocating a special price for this. He believed it might be good, as a matter of policy; but as a matter of equity, he had not been able to convince himself that it was the right thing to do. The subject was so interesting that one felt it ought to be dealt with as fully as possible.

Mr. A. Yuill (Dundee) heard Mr. Napier's paper with interest. He felt that they were all passing through what he might term the spirit of evolution. In the past, most of their time at these meetings was taken up with matters pertaining to the manufacture of gas. But a change had taken place; and they were more concerned now as to the amount of business they could possibly do by paying attention to the little details which were essential in every well-balanced organization. As they were aware, he had, to some extent, gone on the lines advocated by Mr. Napier; and they had every reason to feel and experience the benefit of the change. The financial position of the undertaking bore out the fact—so much so, that he would not like to go back to the old order of things. He considered that anyone who did not place before consumers all the advantages they possibly could, were standing not only in their own light, but also in the interests of the consumers. In looking at this matter, he had always had before him the fact that when they considered the commercial management of gas-works, and asked who they belonged to, the answer must be that they belonged to the people; and if any of them were guaranteed a sum equal to pay all working charges, interest, and sinking fund, they would require nothing more. If they got this from the gas, they would have all they required; and if they gave cookers and fires free, they would require to compensate themselves by the price they charged for gas. In considering the question, they were confronted by the fact that they must differentiate between their consumers, and in the way the gas was consumed. They would admit that if they were able to get consumers paying them a large sum for gas for other purposes than lighting, they ought, in all fairness, to have some consideration, and more especially when the sum was taken at a period when the lighting made no demand upon them—in other words, a day-load. This also referred not only to cookers and fires, but to gas-engines. He fixed cooking stoves and fires free; but in the case of fires, he made a charge of 10 per cent. on the net cost, as hire. This was done advisedly, because, as they knew, if a party gave up a cooker, it could be cleaned and sent out again; but in the case of a fire, it was so much a matter of taste that this could not be done. Therefore, they should be content, so long as their consumers were content to pay the 10 per cent. Engine users should pay a differential rate. They were large consumers; and the corporation were put to very little expense in the fitting of them up. This was a consideration which was very often forgotten. Mr. Napier mentioned about the fitting in of pipes in new houses, or rather that architects should recognize the claims of gas-fires. When corporations did their own fixing, architects naturally said they were not going to put in gas-pipes, because the corporation would do it free of charge. They ought to endeavour to go hand-in-hand with architects; and if the architects were able to determine the class of tenants, and whether the tenants would be at all likely to consume gas, then they would be well advised to collaborate, and have all the piping done during the erection of the buildings. When they looked back and recollected that one day's consumption of gas in winter was seven times more than a day's consumption in summer, and considered the present position of matters—70 per cent. of the gas being sent out between 6 a.m. and 6 p.m., and only 30 per cent. during lighting hours—this was a very great factor in the question before them. They all knew the benefits that a day-load gave them, when they came to consider the question from the point of view not only of interest and sinking fund but of other standing charges. Mr. Napier had mentioned the relative price of gas in comparison with coal. The figure that was given them, of 1s. 4d. per 1000 cubic feet, he presumed was the price Mr. Wilson would require to sell his gas at in Glasgow to compete with coal. But this could not be a fixed sum, applicable to all, because they were aware that the price of house coal, delivered locally, varied in different towns, depending upon their proximity or otherwise to the coalfields. While it was 1s. 4d. in Glasgow, possibly he might be able to meet the matter with 1s. 6d. He tried to meet consumers as far as possible. The ordinary lighting rate was 2s. 3d. per 1000 cubic feet, and for other purposes than lighting from 2s. to 1s. 7d.—all less 5 per cent. In fixing these rates, he was merely following equity, because they were charging practically the same price for gas consumed in cooking-stoves, and giving a concession to engine users, and also to users of gas for industrial purposes.

Mr. Wilson raised the question of charging piping to revenue. He believed that in every well-balanced concern the more they could carry to revenue the better it was for the undertaking. But they must admit that there was a limit; and the limit was forced upon them now by the Secretary for Scotland. He did not know whether any of them there had had reason to interview the Secretary for Scotland or his assistants, as he had the previous week. He found that they now imposed very stringent measures on those who were seeking borrowing powers. A Committee of the Department sat some time ago, and a scheme was passed through Parliament providing for the number of years which would be given for the sinking fund, applicable to various classes of expenditure. In the case of gas-works, thirty years had been allowed; for purifying plant, twenty years; and for fires and cooking-stoves, they only gave ten years. If they had to redeem them in ten years, it became a serious matter; but, on the other hand, if they paid the expenditure out of revenue, they did not require to borrow, and therefore the outlay did not become a charge upon the sinking fund. He mentioned this to show the stringent measures which were required by the Secretary for Scotland, and which required them to consider the financial matters in a different spirit from what they did formerly.

Mr. A. B. Langlands (Glasgow) thought that all gas managers must face this question, and face it now, because their competitors were not asleep. He had a hobby for the fixing of apparatus free. He would fix free, and take the chance, because the benefit was not to be a present-day one, but a continuing one. The question of working with architects and builders was vital. A good deal more could be done in the direction of getting architects and builders to come to them for advice and assistance, and the mutual adjusting of pipes, and so on. In the old days, his chief—Mr. M'Gilchrist—handed a scale of conditions to architects and builders; and he took up the position that he would not supply gas unless there was a certain size of pipe. The hiring of gas-fires was growing every day; and in this connection, they should not be afraid to scrap. People who had gas-fires fifteen or twenty years old would say, "Gas-fires are horrid thing." Therefore, scrap freely.

Mr. G. R. Hislop (Paisley) remarked that the question was put as to whether they were to leave the rate for gas cooking alone and consider free fixing and free rentals abundantly satisfied the consumer, because they, as gas suppliers, had practically a monopoly of the business. He said "No." He maintained this in the granting of free stoves. Everyone should consider the propriety of giving stoves free; and fitting them up as well. As to the reduction in the rate, equal to about 4½d. per 1000 cubic feet, this was exactly the rate given in Paisley for power and commercial purposes, to all who made application for gas for such uses. They required only to be assured that the article they were employing gas for was one which was being manufactured to be sold. This constituted a commercial purpose; and therefore the users were entitled to a reduction. For commercial purposes, if they consumed 150,000 cubic feet per annum, they had a meter free; but those who consumed less had to pay for the meter to measure the gas. He was not quite in agreement with those who advocated the hiring of gas-fires. He had never seen his way to give out gas-fires, as the difficulty arose that consumers never were satisfied with the article, and became careless in its management. But he believed that the hire-purchase system would largely meet the difficulty, because consumers would then be interested in keeping their fires in condition, being part purchasers of them. Mr. Napier gave some important facts in connection with distribution and rates—facts which were worth attention. He commended the paper to their careful consideration. They should follow up the lines Mr. Napier had laid down, or the suggestions he had made. The paper would be of great value, as raising many important questions.

Mr. J. Napier Myers (Saltcoats) was prompted to rise at this stage to give voice to what might be termed the old-fashioned view of these matters. He must confess himself to be wholly against the ironmongery business. He had the honour to serve a gas company; and the ideas that floated about the gas world generally were brought to their notice by people in adjoining places like Glasgow, Coatbridge, &c. They came to them with stories about what they could get for nothing. His directors often had this brought before them; and he had always felt it to be his duty to counsel them to give nothing for nothing. This free policy was not a wise one; but they ought to address themselves to the supplying of gas as cheaply as possible. Consumers would find out the appliances that best suited them, and would be able to adapt them to their genuine uses. He had also found it to be his duty to counsel his directors in the same way with regard to differential rates being charged for gas—that they ought not to follow the gas beyond the meter; that it was no concern of theirs what use a consumer made of his gas; and that they should not be irritated by finding that the initial price of gas was so much, but that if he used it for washing himself he would get 5 per cent. reduction, if he used it for cooking he would get 7 per cent., and if he used it in a gas-engine he would get 12 per cent. All these differential rates were odd. Then they ought to sell gas at the lowest possible price. He had put it to his directors that, if they looked upon him as a hypothetical tenant, they would expect 5 or 7 per cent. return upon their money; and the consumer, on the other side, would look for a reduction in price for large business. Certainly there was room for discount for cash to a good consumer; but he did not think their business would warrant giving

rebates up to 28 per cent. Evidently somebody was paying all such. He must confess himself as being against these whole-hoggers altogether. Such large rebates ought not to be possible to any class of consumer; and if they, as gas suppliers, were undertaking the distribution of free ironmongery, evidently the price of it must be put upon the gas. He would be in favour of reducing the gas to as low a charge as possible, and letting the consuming public find out the appliances they wanted. By raising the technical knowledge and skill of the consumer, they would be able to supply the raw material of cheap gas in a way that would best suit them, and with the least irritation to gas managers.

Mr. W. B. M'Lusky (Perth) said they were much indebted to Mr. Napier for his paper. The remarks of Mr. Myers were reminiscent of their early youth, when the gas manager was seldom seen beyond the gate of the gas-works. There were two ways of providing facilities for the different uses to which gas was put; and these had been very well placed before them. One speaker had said it was necessary to provide the same facilities for the use of gas for cooking and heating that were provided for its use for power and industrial purposes; and Mr. Napier stated that 4½d. per 1000 cubic feet was the figure that represented the difference in his case. In Perth, it was found that this was about the difference between the value of gas used for power and for other purposes. They gave, however, a scale of differential rates, which was peculiar to Perth in that no consumer got a rate which was not available to the other. Each consumer paid the same for every 1000 cubic feet burned. For power or industrial purposes, they charged 2s. 6d. per 1000 cubic feet, which was 4½d. less than the ordinary rate; and they provided such facilities for cooking and heating as were equivalent to the 4½d. They did not supply free cookers, although he was in full agreement with all that had been said regarding them. They fixed free and maintained free. In reference to the power rate, for every 100,000 cubic feet after the first 100,000 feet, there was 2d. reduction, until the tenth 100,000 was reached, when the charge was 1s. per 1000 cubic feet. They had only one consumer of this quantity. He was a glass blower; and he found that, for annealing purposes, gas was cheaper than coke or coal. When this particular consumer applied for gas, they had no trader who asked for the special rate. They had simply adopted the special rates in the hope that they might attract customers. This particular glass blower found that one gas-fire did the work of five coke-furnaces, and that fewer men were required to do the work. He found that gas at 1s. 4½d. per 1000 cubic feet was cheaper than coke. In the same way, gas at 1s. 4½d. was cheaper than suction-gas in Perth. He did not wait till a consumer returned a gas-fire. They had a system of inspection, under which people were called upon twice a year; and if a fire were found to be not satisfactory, they scrapped it and put in a new one. The fire business was more profitable than the cooker business, because in every house, while they had only one kitchen, they had several bedrooms, and a public room, or more. They commenced to hire gas appliances in 1896. They had now 1375 gas-fires, out of 10,798 gas appliances in use. There were 2978 gas-cookers, 2320 gas-boiling rings, 3012 gas-irons, 496 hot plates, 27 baking plates, and 60 miscellaneous articles. It was thirteen years since the Corporation commenced to hire these articles. Ten years ago, after three years' effort, there were 1100 articles in use, representing a value of £9000. To-day there were 10,798 articles in use; and the capital account involved was less now than it was then. It had been written down by the use of these articles. It had not been done by the use of gas for lighting, because the hiring business did not exist till the users of the apparatus came to employ the gas. The same consumer was also using gas for lighting; and no more plant was required to supply him. The plant he used he paid for—both fitting up and maintenance. He agreed thoroughly with a progressive policy in the matter of cooking and heating.

Mr. Napier, in closing the discussion, said he thought it to be his duty to bring this particular matter before them, because, to a Technical Association, it was a question of great moment, and one that was pregnant with great possibilities, so far as the gas industry was concerned. What he wished particularly to impress upon them was that, in the field of gas heating, they had such possibilities as were extremely difficult to measure. They knew that, at the advent of cooking by gas, they had to feel their way cautiously and slowly; but they were now satisfied that the fitting up of gas-cooking appliances free—hiring them out, and in some instances giving them free—was an apparently correct policy. Mr. Wilson seemingly had some fear hanging over him in regard to ironmongers and traders. He (Mr. Napier) thought, however, it ought to go out from the meeting that gas companies and corporations were not single individuals looking to their own interest, who ought not to take up the business of fixing gas appliances, and that if plumbers and gas-fitters were willing to co-operate with them, on proper lines, and to keep in view their interests, they would welcome their help. Mr. Myers he should like to treat generously, and with great sympathy. He felt that Mr. Myers was just, as it were, ferrying over a very deep stream, with great danger to himself, and with very little hope of getting to the other side; and he should not like to say that Mr. Myers, after a careful study of the whole subject, would advise his own Company to do what he apparently, at that moment, thought to be the safe policy. They must remember that they lived in changing times, and that the public were to be served and satisfied, not according to any mere financial requirements of a dividend-paying concern. It was not simply to gratify a demand for money, but to promote the interests of the gas department, and the interests of the public, in a broad-minded way. The question of a less rate for heating purposes had been opposed on the ground that they were not observing equity; but, as he had stated before, a simple principle in equity could not hold force when they had to recognize that unless they put before the public certain advantages, and gave them fuel at a cheap rate, it was impossible to do business with them. No business man stood still and saw the volume of trade passing his door, without making an endeavour to gather it in; and while it was true that both classes of consumers were using the same gas, they must recognize that, as regarded the lighting consumer, their present rates, taking into account the efficiency of the incandescent burner, were in every way satisfactory. Another reason why they should not tie themselves to the principle of equity was simply that competition was with them; and he was satisfied, at this moment, that if they carried on their business on good, commercial lines, they were on the threshold of increasing it to an enormous extent.

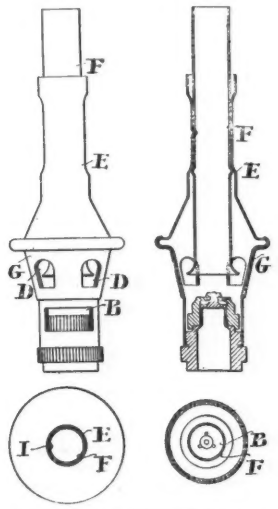
REGISTER OF PATENTS.

Incandescent Gas-Burners.

Block Light Company, Limited, and Webber, J., of Manchester.

No. 16,998; July 21, 1909.

These inverted incandescent gas-burners have the usual bunsen gas inlet apertures and an internally screwed and perforated cap supported over the apertures, for regulating the flow of gas. The ports in the cap serve to direct the gas in several jets into the air-chamber D.



An Improved "Block" Burner.

Within this chamber and the extension E (upon which the bent arm of the inverted burner rests) is a tube F, having a bell-mouthed or funnel-shaped end adjacent to the gas inlet apertures. The gas from the latter is directed in several jets into the funnel-shaped end, and draws in air—the gas and air being concentrated and intimately mixed as they pass through the funnel and the tube. The air-chamber is provided with a sleeve G for regulating the inflow of air. In this way, it is possible to obtain a greater velocity of flow of gas and air to the burner-head than with the form of air-chamber at present employed—of great advantage in preventing back-firing where the gas and air mixture has to travel through a bent conduit or pipe from the bunsen to the burner-head.

Discharging and Charging Machines for Gas-Retorts.

West, J., of Southport.

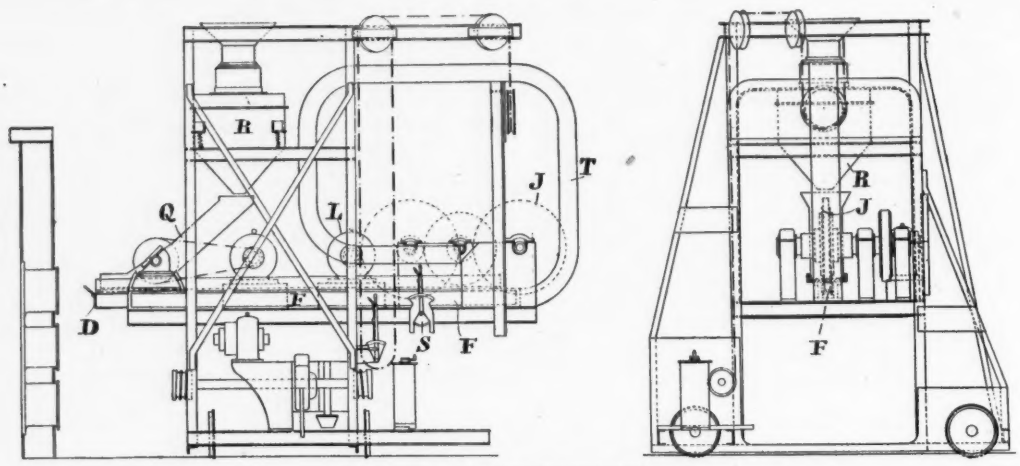
No. 20,653; Sept. 9, 1909.

This invention has for its object the discharging of a retort during the outward stroke of the discharging ram and charging it during the return stroke of the ram into the framework of the machine.

The machine (mounted on wheels in a framework and provided with gearing for adjusting it to the tier of retorts to be operated upon, and for travelling it along the front of the retort-stack) consists of the combination of a ram discharging machine and a charging machine of the projector type in conjunction with a telescopic plate or shoot fixed at the discharging ram head end to the telescopic ram and free to extend or close up, with discharging rams for the purpose of directing the charge of coal from the projector over the ram head on to the floor of the retort as the discharging ram is being withdrawn from the retort.

A general description of the arrangement, with a series of illustrations, appeared in the "Journal" for April 5, p. 24; and to-day we reproduce (p. 336) one sheet of drawings from the specification showing a side elevation of the discharging and charging machine with the discharging rams and telescopic plate or shoot closed up in the framework of the machine; also an end elevation of the machine looking towards the retort-stack.

F is the stationary outer tube or casing of the discharger, in which the telescopic rams work—being driven into the retort and closed up in the framework of the machine by means of the sprocket wheel J



West's Combined Retort Charger-Discharger.

operated by the motor. A chain is attached to the back end of one ram, and, when the rams are both extended in the retort, is partly enveloped in the telescopic ram or casing; the portion of the chain between the sprocket wheel L and the ram being provided with slipper links, which slide in a path in the casing F for the purpose of keeping the chain rigid. The back portion of the ram is also provided with a slipper block, which slides in the path in the casing F. The chain for operating the discharger is stored in the casing T when the telescopic ram and shoot are closed up in the machine.

D is a fixed discharging or pusher head attached to one of the telescopic rams, and is provided with a hinged plate kept in the position shown in full lines by means of stops resting against the fixed head. The hinged door, on coming into contact with the coke on the discharging or outward stroke, closes up so as to cover the mouth of the telescopic plate or shoot until the whole of the coke is discharged, when the hinged door again falls. Q is the rotary or projector charger driven by a motor and supported on brackets clear of the telescopic shoot or plates, leaving them free to extend or close up in the framework of the machine. This charger Q is provided with the necessary coal-hopper R, and mechanism for operating it. The motors are controlled by the controller S.

The method of operation is as follows: The discharging rams, together with the telescopic shoot or plates, are driven into the retort by the motor and gear L and J operated by the controller S. The direction of travel of the telescopic rams and the telescopic shoot or plates is subsequently reversed, and at a suitable time during the return stroke the rotary projector charger Q is set in operation; the coal being directed along the telescopic shoot or plates over the hinged plate on to the floor of the retort—the two operations of charging the retort and returning the discharging ram together with the telescopic plate or shoot into the framework of the machine being so controlled that the coal is laid regularly in the clear retort on the discharging side of the ram-head as the discharging ram and telescopic plate or shoot are leaving the retort.

Coin-Prepayment Mechanism Operating from a Distance.

PEEBLES, W. C., of Bonnington, Edinburgh.

No. 19,489; Aug. 25, 1909.

This invention relates to coin-prepayment mechanism intended to be used in connection with fluid meters, and has for its object to provide means whereby such meters may be operated from a distance—thus permitting of the money-box and its mechanism for receiving the coin being placed in any position readily accessible to, and under the observation of, the parties responsible for its safe custody; while the meter may be in the position most suitable to the arrangement of the supply and delivery connections—such, for instance, as in a comparatively inaccessible cupboard, or even outside the building. The mechanism for receiving the coin (on being operated) transmits a corresponding movement to the delivery-determining mechanism of the meter, through the medium of a fluid (air or water) within a tube extending between the points of transmission and reception, or the movement may be effected by other equivalent means—for example, a flexible wire or cord.

Figs. 1, 2, and 3 are horizontal, vertical, and transverse vertical sections of the coin receiving and motion transmitting part of the mechanism of one example of the present invention—a sufficient part of the receiving and delivery-determining mechanism of a meter for this example being shown in sectional elevation in fig. 4.

In coin-prepayment meters such as are described in patent No. 2615 of 1902, there is provided a money box A separate from the meter. A coin is passed into the box through a slot in its upper surface, and drops into a coin pocket consisting of two projections B B^1 on bosses fixed to a spindle C passing through bearings on opposite sides of the box. A third projection on a boss is loosely pivoted on the spindle between the two fixed bosses, so that a coin falling between the projections B B^1 and the movable projection locks them together—the parts being shown in this position in figs. 1, 2, and 3. The central boss also carries a lever D controlled by a spring or equivalent, and connected by a rod with a piston in either a pneumatic or hydraulic cylinder, which is, in turn, connected by a tube E with one end of a corresponding receiving cylinder E^1, in which is a piston connected by a rod with a pawl-carrying lever or equivalent mechanical device, acting on the delivery-determining mechanism of the meter. Only one (K) of the pinions of this mechanism is shown; the remainder of the mechanism being similar to that described in the earlier patent referred to. A handle G is fixed on one end of the coin pocket spindle C outside the money box.

Fig. 1.

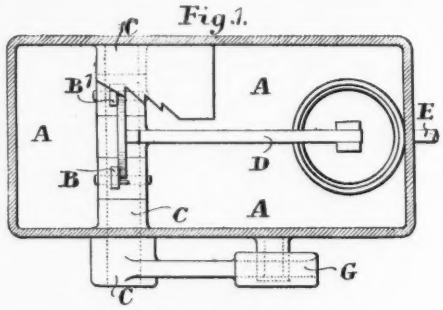


Fig. 2.

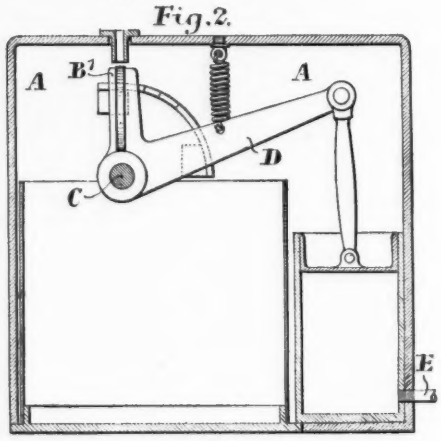


Fig. 3.

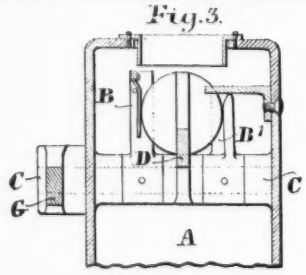
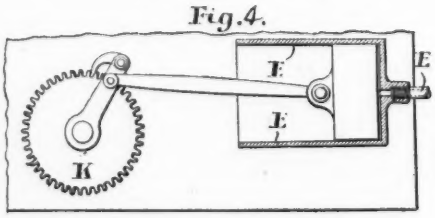


Fig. 4.



Peebles' Prepayment Meter Mechanism.

When the handle is depressed until it bears on the stop shown, the spindle is rotated and causes the fixed projections B B^1 to act on the coin, and, through the latter, move the loose projection and the

lever D. The movement of the lever causes the piston within the transmitting cylinder to force the fluid through the tube E to the receiving cylinder, so that the piston therein is also moved on end, and, acting through a rod and pawl lever, gives the desired movement to the delivery-determining mechanism of the meter to open the supply valve, the movement of which in the reverse direction (to shut the valve) being effected by the meter-setting mechanism described in the earlier patent, or by other equivalent mechanism.

When the coin pocket is being rotated as described to open the valve, one edge of the coin encounters a notched inclined bar, which moves the coin edgewise against a light spring blade secured at one end on the projection B until the coin is freed from the other projection fixed to the spindle. Then the lever projection, through the action of the spring, throws the coin out into the cash receptacle. The notches in the inclined bar catch the coin, so that it cannot travel back with the pocket—thereby ensuring that the user cannot effect what is known as "pumping."

When the spring-controlled lever D rises, the piston in the transmitting cylinder is also raised, tending to produce a vacuum in the cylinder and in the connecting tube E, the piston in which latter therefore also moves on end to return the pawl lever to its original position ready to again act on the delivery-determining mechanism of the meter when the handle lever is again depressed.

The receiving cylinder is preferably placed horizontally, to prevent the weight of its piston tending to slowly actuate the mechanism when the meter is not in use. Where liquid is used as the power-conveying medium, to compensate for possible leakage of the fluid past the piston in one or either cylinder inlet check valves communicating with one or more reservoirs may be provided in the circuit.

As stated, a flexible diaphragm may be substituted for the cylinder and piston of both the transmitting and receiving mechanism.

Incandescent Mantles.

VISSEAUX, J., of Lyons, France.

No. 23,434; Oct. 13, 1909.

The process of the present invention consists in burning a fibre or fabric on which is fixed not a salt but a hydrated peroxide obtained by the action of hypochlorites on the solution of illuminating salts. Commercial nitrate of thorium, having 48 per cent. of oxide, is, the patentee remarks, an indefinite and always acid composition; and the reaction of hypochlorites on rare earths is only made in an almost neutral solution. It is consequently necessary that the bath of the illuminating salts contains as little free acid as possible.

It is proposed to soak the threads or fabrics in a bath composed as follows: After having prepared a solution which contains (for example) 22 parts of commercial nitrate of thorium, 10 parts are incorporated of hydrate of thorium of the formula $Th(OH)_4$, which dissolve by reason of the free acid contained in the solution. Then the filaments are rapidly passed (properly dried) through a bath of chemically pure hypochlorite of soda of about 25° measured on the chlorometer; and they are then washed in distilled water to completely remove the excess of hypochlorite and the alkaline salt formed. The filaments are next dried at a suitable temperature, when they are ready to be incinerated.

Other methods of carrying out the process are as follows: (1) By treating the nitrate of thorium only by the hypochlorite and, after washing and drying, in adding the nitrate of cerium in the form of a soluble salt. The small quantity of nitric acid which is disengaged during the incineration does not affect the strength of the mantle. (2) By adding to the solution of hypochlorites any mineral or organic salt or base which could facilitate the precipitation of the hydrated peroxides. (3) By employing any organic chlorated compound having the same oxidation properties.

As an example of bodies which can be added to the solution of hypochlorites to facilitate the reaction, the patentee says that acetate of soda can be used, which allows the complete precipitation of nitrate of cerium by the hypochlorite. This reaction is employed in chemical analysis to secure the separation of cerium from a solution of lanthane and of didium.

As an organic chlorated compound (for example), a solution of phenyloid chloride in ether, ligroin, or sulphide of carbon can be used. This compound of the formula $C_6H_5ICl_2$ obtained by the action of chlorine on iodobenzol decomposes in presence of water into iodobenzene C_6H_5I, iodosobenzene C_6H_5IO, hypochlorous acid HClO, and hydrochloric acid HCl. As a further example, acetate of chlorine of formula C, H_3C, OOCl decomposed by water into acetic acid and hypochlorous acid could be cited. As products of reaction, the hypochlorites give with the salts of rare earths the hydrates corresponding to peroxide of thorium Th_2O_5 and to peroxide of cerium CeO_2.

The patentee admits that he is aware that it has been proposed in the manufacture of incandescent mantles to use hypochlorites for mercerizing the thread before the impregnation with the illuminating salts, but such use has nothing in common with his improved process; and he lays no claim to it.

Composition for Purifying Air Gas.

MOORES, W. G., of Bournemouth.

No. 28,054; Dec. 1, 1909.

This invention relates to a composition for use in purifying air gas, whether for use in lighting, heating, or for power purposes—consisting of asphaltum, bitumen, pitch, chloride of ammonium, and chloride of lime in certain proportions—viz., asphaltum 1 lb., bitumen 1 lb., pitch 1 lb., chloride of ammonium one-sixteenth part, or 1 oz., and chloride of lime one-third part, or 5⅓ oz. The constituents are thoroughly amalgamated while in a heated state, and then formed into a perforated or composite block, which is placed in the gas-making chamber or in a chamber between the gas-making chamber and the burners or apparatus, so that the air, after being impregnated in the oil or spirit chamber, and thereby turned into gas, will pass through the block and be purified by action against the surfaces of the block before being used.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

High Pressure Street and Shop Lighting.

SIR,—In your last issue, I notice an article, under the heading of "The Development of High-Pressure Gas Lighting." This particular article has an illustration showing a parade lighted by means of Keith's high-pressure inverted lamps. As there is nothing in the article to denote where this special example of parade lighting is to be seen, might I say that it is a scheme which has been carried out by my Company—the high-pressure main extending along the High Road and the Cranbrook Road, Ilford? The illustration shows the Cranbrook Road, which is one of the main thoroughfares leading from the Ilford Railway Station.

It might be of interest to your readers to know that this parade was first lighted on the high-pressure system in the year 1901—the so-called high-pressure at that time being about 8 inches. The lighting by this system was continued until about a year ago, when my Company installed this more up-to-date high-pressure inverted lighting.

I might add that this new lighting has given every satisfaction, not only to the shopkeepers themselves but also to the Gas Company, owing to its exceptional lighting qualities, and in its having proved itself so reliable and free from trouble. It has also been the means of retaining this parade solely for gas lighting. Some of the original lamps were getting rather the worse for wear; and if the new scheme had not been brought into operation, we would probably have lost a few of our consumers.

This parade is quite close to Ilford Station; and I shall be only too pleased to show the compressing plant and give any particulars to any one contemplating high-pressure lighting.

W. B. FARQUHAR.

Ilford, July 28, 1910.

The Examinations in Gas Supply.

SIR,—With reference to the drawings supplied with Question 8 in the recent "Honours Gas Supply" examination, copies of which were reproduced on p. 259 of the current volume of the "JOURNAL," may I venture to point out the error which has been made in projecting the enlarged section (fig. 11) from the elevation (fig. 9)? In the latter the ground level is shown at the same level as the top of the cornice, while in the former it is shown a considerable distance below the bottom of same.

A. E. BULLEN.

Plymouth, July 29, 1910.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills read the third time and passed: Bradford Corporation Bill, Bristol Gas Bill, Fylde Water Board Bill, Middleton Corporation Bill, Pontypridd and Rhondda Joint Water Board Bill, Rhondda Urban District Council Bill, Slough Water Bill, Water Provisional Order Bill, Wemyss and District Water Order Confirmation Bill.

Bills Royal Assented: Bishop's Stortford, Harlow, and Epping Gas and Electricity Bill, Brighton and Hove Gas Bill, East Grinstead Gas and Water Bill, Egremont Urban District Council (Gas) Bill, Exmouth Gas Bill, Exmouth Urban District Water Bill, Garnant Gas Bill, Gowerton Gas Bill, Great Grimsby Gas Bill, Mallow Urban District Gas Bill, Matlock Bath and Scarthin Nick Urban District Council Bill, South Hants Water Bill, South Lincolnshire Water Bill, Southend Water Bill, Thorne and District Water Bill, Worksop Urban District Council Bill.

The Pontypridd Water Bill has been withdrawn.

The Falkirk Corporation Gas Order Confirmation Bill and the Fraserburgh Water Order Confirmation Bill have been presented, read the first time, deemed to have been read a second time, and reported.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bill read a second time: Wemyss and District Water Order Confirmation Bill.

Bill reported, with amendments: Warrington Corporation Bill.

Bills read the third time and passed: Abertillery and District Water Board Bill, Falkirk Corporation Gas Order Confirmation Bill, Fraserburgh Water Order Confirmation Bill, Gas Orders Confirmation Bills Nos. 1 and 3 [Lords], Paisley Gas Order Confirmation Bill [Lords], Water Orders Confirmation Bill [Lords].

On Thursday, Lord Charles Beresford asked the President of the Local Government Board, in regard to the Gas Companies (Standard Burner) Bills, Nos. 1, 2, and 3, whether he was aware that, under the Acts and Orders relating to such companies, the local authorities were charged with the making of the official tests; whether he had any official information showing that if the Bills were passed the gas supplied would be of a considerably lower illuminating and calorific power; whether he was aware that the fact of grouping in one Bill the proposals of a large number of companies rendered it practically impossible for each local authority to put before the Committee the grounds of their objection to the Bill as affecting the particular

company supplying their locality; and whether any local authorities had lodged objection to the Bills. The questions were answered for Mr. Burns by Mr. Sydney Buxton as follows: "The testing of gas is in the hands of local authorities, subject to the provisions of the Gas-Works Clauses Act, 1871, and of the Local Acts and Orders relating to the respective companies. I have no official information as to what will be the effect of these Bills if they become law. I understand that various local authorities opposed the Bills before the Committee to which they were referred; and I have seen the reports from the Committee which state that, in the opinion of the Committee, 'the inclusion of several cases in the Bill did not present any difficulty in the submission separately of any of the cases in opposition.'"

Last Wednesday, a question was put to the Prime Minister by an honourable member, on behalf of Mr. J. G. Butcher, as to whether his attention had been called to the recent report from the Select Committee on the Water Supplies (Protection) Bill; and whether, in view of the grave difficulties arising in connection with the abstraction of underground water by water authorities and others, and of the demand for an alteration in the law as regards compensation for injury caused by such abstraction, he would favourably consider the recommendation of the Select Committee, to the effect that a comprehensive inquiry into the whole subject of surface and underground water supplies should be held. Mr. Asquith, in reply, said he understood that, prior to the appointment of the Joint Select Committee, his right honourable friend the President of the Local Government Board (Mr. Burns) had decided to introduce a Bill to give effect to the recommendations of the Royal Commission on Sewage Disposal, recently endorsed by the Joint Select Committee on Water Supply. The recommendations of the Committee would be carefully considered by the Government in connection with the Bill in question.

GAS COMPANIES (STANDARD BURNER) BILLS.

Consideration on Third Reading Postponed till November.

The Gas Companies (Standard Burner) Bills Nos. 1, 2, and 3, were again before the House of Commons at the time of private business, "for consideration by Order," on several days last week; but on each occasion objection was taken, and they were formally postponed. They will not now come on before the 15th of November, the date fixed on Friday last for the re-assembling of Parliament for the autumn session. There were several amendments on the paper for the rejection of the Bills, and also motions for the insertion of the following clause, noticed in the "JOURNAL" last week, for the protection of gas consumers:—

(1) As from Jan. 1, 1911, the price to be charged for the gas supplied by the promoting companies shall be such as will secure that the consumers of the company shall not be prejudiced by the provisions of this Act.

(2) The price to be so charged shall be such price as may from time to time be agreed upon between the company and the local authority or authorities of the district or districts within the limits of supply of the company, or as, failing agreement, may be determined by a single arbitrator to be agreed upon between such local authority or authorities and the company, or, failing agreement, appointed by the Board of Trade.

LEGAL INTELLIGENCE.

GAS WORKMAN'S COMPENSATION TERMINATED.

At the Croydon County Court, on Monday last week, Dr. W. B. Addison sat as Medical Assessor with the Judge, under the Workmen's Compensation Act, to hear the application of the Croydon Gas Company to terminate the weekly payment of 13s. to John Harvey, one of their employees. Dr. Newnham appeared for the applicants; Mr. A. H. Forbes represented the respondent.

According to Dr. Newnham's opening statement, on Nov. 18 last year Harvey fell backwards as the result of a rod breaking in connection with the elevating tackle, and sprained his back. The applicants sought determination of the agreement from the 27th of May last, on the ground that the disability arising from the accident had ceased.

Dr. H. W. Drew, who examined Harvey at the request of the Company, said he found the man could bend forward and touch his feet, bend sideways, and move his back round in all directions without hesitation. There was no evidence of any injury whatever. The man admitted having taken a good deal of beer in his time, but not so much lately. In cross-examination, Dr. Drew said he would swear that the pain the man complained of was due to lumbago, and not to a sprained muscle. Dr. Chapman, the Medical Officer to the Company, certified on the 26th of May that the man was able to resume work. He saw no reason to differ from what Dr. Drew had said.

Mr. Forbes submitted that there was no case. Applicants must show that since the 14th of May there had been a change of circumstances; and this they had not done. He called Dr. Morrison Orr, who said he first examined Harvey on the 13th of May. He complained of pain in the back and slight pain in the right groin. He had tenderness on pressure, and after bending forward to try to touch the floor he had difficulty in raising himself to an erect position again. He was suffering from sprained muscles. When witness examined him again on the 26th of May, there did not seem to be much improvement; and he was still suffering in June. At none of the interviews were there signs of alcohol having been taken. The present condition of the man's back was due to the accident; and he was not now able to resume his work.

Harvey was called and described the accident which resulted in his falling across a sleeper. It occurred just before dinner time; but he remained all day and practically did no work. Next day he went to see Dr. Chapman, who did not examine him at all, beyond feeling through his trousers. His back was very much swollen. On the 21st of April, Dr. Chapman gave him a certificate that he was unfit for work; the Company having previously expressed their intention not to continue the payments. From April 16 to May 5, when his Solicitor wrote to the Company, he did not receive any payments. The arrears were subsequently paid; but the Company intimated that they were not willing to take him back into their service, even if he was willing to return. He did not know why. He was not shamming, and still had pains in the back and stomach. He denied having been the worse for drink.

Counsel having addressed his Honour, the latter consulted with the Medical Assessor, and said he was satisfied that Harvey was now quite recovered. Dr. Drew had made a careful examination of him, and found he was able to move his body and back in every way, which was entirely inconsistent with what the man now stated. Under these circumstances, the payments must terminate from the 27th of May.

WATER SUPPLY FOR RAILWAY STATIONS.

In the Court of Appeal last Thursday, the Master of the Rolls and Lords Justices Farwell and Kennedy heard the concluding arguments in an appeal by the Metropolitan Water Board against a decision given by Justices Phillimore and Bucknill affirming an order made by the Judge at the Westminster County Court in an action brought by the Board against the London, Brighton, and South Coast Railway Company to recover the sum of £12, the amount of four quarters' water-rate alleged to be due from them in respect of their West Norwood Station. The contention on the part of the Company was that the water was supplied for other than domestic purposes; and this was upheld. The proceedings in the Court below were reported in the "JOURNAL" on March 1 and 22 last (pp. 598, 824). The Metropolitan Water Board (Charges) Act, 1907, provides by section 8 for a supply of water for "domestic purposes" at the request of the owner or occupier of any house or building occupied as a separate tenement within the limits of supply of the Board at a rate based on the rateable value of the house or building. Section 16 provides for a supply of water by measure for "purposes other than domestic" at rates varying with the quantity furnished. By section 25, "domestic purposes" are deemed to include water-closets and baths of a certain capacity, but not a supply of water for "railway purposes." At the defendants' station at West Norwood, which was separately rated, there is no station master's house, but there are waiting-rooms, a porters' room, and a booking office; on the up and down platforms are urinals and two water-closets—one for the passengers and the other for the staff—also on each platform a tap from which water was drawn for drinking and for cleansing the platform. For the appellants it was contended that the water was supplied to the station for "domestic purposes," and that they were entitled to charge at a rate per annum not exceeding 5 per cent. of the rateable value of the building in respect of which the water was furnished.

Mr. Danckwerts, K.C., and Mr. A. B. Shaw (instructed by Mr. Walter Moon, the Board's Solicitor) appeared for the appellants; Mr. Younger, K.C., and Mr. Clode (instructed by Mr. P. V. Rose) represented the respondents.

At the conclusion of the argument, their Lordships came to the unanimous conclusion that the decision of the Court below was right, and dismissed the appeal with costs. They expressed the opinion that the supply to the station came within the category of "railway purposes," which were especially excluded from "domestic purposes" in section 25 of the plaintiffs' Charges Act.

Affairs of the Ticehurst and District Water and Gas Company.

Last Tuesday, Mr. Justice Swinfen Eady had before him, in the Chancery Division of the High Court of Justice, a petition presented by Mr. Baker, trading as Messrs. Baker and Co., for the winding-up of the above-named Company. Mr. Greig, who appeared for the petitioner, said his firm were judgment creditors for £457 odd. The Company had, in reply, put in an affidavit which he had only just seen; and therefore he asked that the petition should stand over in order that he might answer it. Mr. Clayton, K.C., for the Company, opposed the application on the ground that the petitioner was acting in collusion with Mr. Preston, the promoter of the Company, against whom, since independent Directors were appointed in December last, the Company had commenced an action; and he suggested, as appeared by the affidavits, that the petition was presented on the eve of the Long Vacation for the purpose of embarrassing those proceedings. The judgment debt was between three and four years old; and the Company had a counter-claim against the petitioner for a larger amount. The judgment was obtained by consent when there were no independent Directors. There was a Receiver in possession on behalf of the debenture-holders; and if this petition were hanging over their heads for the whole of the vacation, the Directors would have great difficulty in carrying out their statutory obligations, making contracts, &c. After some discussion, his Lordship said he could not dismiss the petition until the petitioner had had an opportunity of answering the affidavits. He did not think any harm would be done by ordering it to stand over until the second petition day in the next sittings.

The Patent Appliances Company intimate that they have removed from No. 6, Holborn Viaduct, E.C., to larger and more commodious premises at No. 15 and 17, City Road, E.C.

Some days ago, a portion of Blackburn suffered in its electricity supply, owing to a cable fault; and a considerable time elapsed before the trouble was overcome, in consequence of difficulty experienced in locating its source.

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MISCELLANEOUS NEWS.

THE GOOD WORK OF CO-PARTNERSHIP.

South London Schemes—A "Coming of Age."

Extraordinarily favoured, inasmuch as the sun shone, were those employees (and their wives) of the South Metropolitan and South Suburban Gas Companies who were lucky enough to be among the 450 guests who last Thursday assembled at the Crystal Palace on the occasion of the dinner, which is held annually, in connection with the co-partnership schemes of the two Companies. These guests, it may be remarked, were the Co-Partnership Committees, some of the foremen, and many of the other employees who had been a certain number of years in the service of one or other of the Companies, and who held not less than a stated amount of stock. The last-named were selected proportionally from all classes by ballot; and the wives were also invited in all cases. Of last week's function, the only thing that can be said—and it is the highest praise—is that it was as successful as its predecessors. After dinner in Lyons's Restaurant, there were some speeches, the spirit of which augured well for "the cause." Then there was a pleasant afternoon in the grounds, and a return to the restaurant for tea. Mr. Charles Hunt, the Chairman of the South Suburban Company, who presided at the dinner, explained that it had occurred to Mr. Charles Carpenter, the Chairman of the South Metropolitan Gas Company—to whom the position rightly belonged on the ground of seniority—that as the two Companies had been associated in these gatherings ever since they were initiated, it would be as well if the Chairmen of both undertakings were to preside over the annual dinners alternately. In addition to Mr. Hunt and Mr. Carpenter, there were present some other members of both Boards, as well as the principal officials of the Companies.

The Loyal Toast having been duly honoured, Mr. Hunt said he would ask those present to fulfil a duty which he hoped, and felt sure, would never be neglected in an assembly of this kind. They all wished to honour the memory of Sir George Livesey, the founder of the feast—the founder of co-partnership as far as gas undertakings were concerned—and he would ask them to do so by rising in their places. After a brief interval of impressive silence among the standing company, Mr. Hunt went on to refer to the robust faith of the Directors in the permanence of co-partnership—a faith which he was sure was not misplaced. Those, he said, who had watched the growth of the movement had been very pleased to notice year by year the increasing stake which the employees held in the Companies. He had had some figures put before him with regard to the South Suburban Company; and these showed that the average holding of employees in the Company had reached £50; and that, while a few years ago there was a little difficulty in finding a sufficient number of co-partners qualified by their holding for the position of Employee-Director, at the present day there were upwards of 39 so qualified. But one feature of this movement which had appealed to him, he thought, with more strength than any other was the provision which it enabled employees to make for their old age or growing infirmities; and he was pleased to say that the present pensioners of the South Suburban Company held between them very nearly £3000 worth of stock. This spoke well for the system, and for the advantages it offered to the encouragement of thrift and the attainment of a modest independence in old age.

The toast of the day was given by Mr. Charles Carpenter, who remarked that it might seem an easy task to propose "Success and Prosperity to Co-Partnership." They were all so in the habit of realizing and recognizing what co-partnership had done for them, that it would appear to be a simple thing to speak on its behalf; but as a matter of fact, so much remained to be said with regard to it, that if one spoke for several hours, it would be impossible to bring out all the points that were of interest in connection with the subject. As they had been reminded, the South Metropolitan Company had now reached the 21st year of co-partnership. (Applause.) That was to say, co-partnership had attained its majority, because it was exactly 21 years ago—in 1889—that the co-partnership scheme, or, as it was then called, the bonus scheme, was launched by Sir George Livesey. Of course, Sir George himself had unlimited faith in its possibilities, as he had in so many engineering matters. He possessed very great foresight; and from his long connection and association with working men, he knew that difficulties which had been growing for many years were coming to a head, and that it was necessary to do something in order to stem and to alter the course of things. For this reason, he brought forward what was then known as the bonus scheme. He carried his Board of Directors with him in every possible way. His scheme was accepted in its entirety; and it was brought before the notice, not only of the employees of that Company, but of the world generally. Well, it was very curious to look back now, and think what happened when the scheme was launched. Many hundreds of men objected to it, and threw up their work with the Company. A large number cast aside the chances of a pension which, in some cases at least, they would have been soon entitled to. It was remarkable when one considered the change that had come over opinions since 21 years ago. Even in more recent years, the idea that co-partnership would not outlive Sir George was not altogether unprevalent. There were people who associated the system with their dear friend, and who were not slow to prophesy that when he was taken away, co-partnership would not remain the great force in the Company which it had been in the past. He need not tell the co-partners present how absolutely incorrect this view had turned out to be. He thought he might say truthfully—and he would not be misunderstood in saying so—that co-partnership had been stronger since Sir George's death than it was when he was alive. The reason was that when they had Sir George with them, he was linked up with the scheme in every way; and co-partnership and Sir George and Sir George and co-partnership were always associated together, and thought of together. Now all this had passed away. There was no more personal association with co-partnership now on the part of the Directors of the Company than in any other portion of its management. Co-partnership stood on its own legs, just the same as any other department; and in doing so, it had proved that it had greater strength, greater force, and greater vitality, than anyone could have imagined to be the case before Sir George left them. In whatever direction they looked, they saw the advantages of the great scheme which had been formulated by their late Chairman with so much care. They had present with them that day good friends—men who had been associated with the working of these two Companies for many years, and who were now occupying seats at the Board-room table. This was one enormous good that co-partnership had done. These men sat as the representatives of the employees on the Board, and had a part in all the discussions which took place there. Another thing which co-partnership had brought about was the change in the continuity of the employment of the workers. Instead of them being engaged on a comparatively short tenure—hourly, or at most weekly—they were sure of their employment, and the wives were certain of their husbands being in good work practically from one year's end to another. In a very few cases, there were three-monthly agreements, but in the large majority there was a yearly one. It must be a great relief to wives to know that their husbands had agreements with the South Metropolitan or the South Suburban Company which ensured employment for a long time ahead; and this was another great good of co-partnership. A further benefit had been, as Mr. Hunt had so admirably expressed it, the provision for old age. It was not necessary now, when old age or infirmity came, to have to depend on the pension generally provided. There was no reason why a substantial sum should not be at a workmen's disposal when old age or infirmity overtook him. Of course, there was a "fly in the ointment," as in all these things. It had happened, in one or two instances, that, owing to the amount of money put by, not only the Company, but England, had lost good workmen, who, by means of money saved, had been able to leave and start a new life under much more favourable circumstances of independence in one or other of Great Britain's Colonies. He was not sorry for this. He was glad to know that people in every sphere of life, including working men, had an opportunity of starting a fresh life in another land, and helping to lay the foundation of a great future in countries beyond the seas. Nowadays co-partnership was more essential than it had ever yet been, certainly in the history of gas companies. Years ago, the most important work was carried out in the retort-house—in the carbonizing department; and supposing they made (say) 9500 or 10,000 cubic feet of gas to the ton of coal, it did not seriously matter at the end of the half year or the year. One scale of working was not so good as the other; but the difference to the company and the shareholders was practically immaterial. But all this had changed now. They had got into intimate touch with consumers in a very different manner from what was necessary ten, fifteen, or twenty years ago. Where the carbonizing department had not grown, the outdoor department had; and if they were to be a great undertaking in the future as in the past, they would have to rely more and more upon those whose business in life it was to get in touch with the consumers of gas. They wanted their goodwill and their faithful service in every way to promote the use of gas in quite a different manner from what was necessary even, let them say, when co-partnership was started. If co-partnership was necessary 21 years ago, he thought he might claim that it was 21 times more necessary to-day. He asked all co-partners to remember that their duties to co-partnership did not begin and end with themselves—that their duties were, if he might say so, to bring the importance of co-partnership—the bearing it had on the Company's work—to the knowledge of all those with whom they came in contact. Co-partnership should be the light which should illumine their daily life.

The toast of "Success and Prosperity to Co-Partnership" having been drunk with enthusiasm, Mr. J. Boraston, a Director of the South Suburban Company, followed with a speech the sentiments expressed in which were also heartily endorsed by his hearers. He said he was aware that he was called upon merely in the unexpected and regrettable absence of his good friend Sir Fortescue Flannery; but there were one or two things he should like to say. In particular, on an occasion like this, they all naturally must think and naturally must speak about the great man to whose genius, foresight, and courage they owed the economical system that they professed, and practised, as co-partners. They who were his devoted followers would do their best to carry on his great policy—seeking their inspiration in the memory of his achievements, and striving day by day to be still more worthy of his great example.

The next gentleman called upon was Mr. Frank Bush, formerly the Secretary, and now a Director of the South Metropolitan Company, who pointed out that in the 21 years since co-partnership was started, over £500,000 had been set aside for the employees—being an average of £24,000 a year. He was informed by his friend Mr. Sims that the value of the holding of stock, and in the withdrawable account and in the Building Society amounted to rather more than £450,000. This was a very good result; and it might be said, "Rest and be thankful." But they must still go on. They must be thankful, but not rest. Of course, a scheme of this kind had its detractors and enemies. Some of the more advanced Trade Union leaders would like to see it collapse. They said that the alleged share in the management in any scheme of this kind was a fiasco. Well, all he could say was he thought the employees would like another £450,000 fiasco—and the sooner the better. There were two ways of dealing with men. There was the road of sympathy and the road of indifference. They all knew how sympathetic Sir George was with the employees, and how earnestly he desired to see their position improved; and he was glad to say the present Chairman, Mr. Charles Carpenter, and his colleagues also had the same object in view. He would say, "Treat men kindly, and trust them; and in the course of time they will trust you." Among the great body of their workmen, he believed this was the feeling which existed. In his Presidential Address to the Institution of Gas Engineers last year, Mr. Thomas Glover said: "It may safely be assumed that Sir George Livesey would wish for no more suitable memorial than that his life's work should be remembered through the wide adoption of a co-partnership system by gas undertakings." He (Mr. Bush) heartily agreed with this observation. Since the last annual dinner, quite a number of gas companies had joined the ranks of co-partnership. On a day like

this especially, they were all remembering Sir George Livesey, and remembering him with gratitude and affection, as the man who fought so strenuously, so fearlessly, so triumphantly for co-partnership.

A South Suburban employee, Mr. W. T. Luther, on behalf of the guests, heartily thanked the Directors for their kind invitation that day. The employees of his Company, he added, cordially congratulated the South Metropolitan Company on the "coming-of-age" of co-partnership. They in the South Suburban Company were not quite so fortunate in regard to length of time—seventeen years, he believed, was their record. The employees were, however, very gratified this year to find that 6½ per cent. was credited to them. He thought this was the highest bonus ever declared by the Company. But if they determined to do even better than in the past, this amount would probably be still further increased. He wished prosperity to both Companies, as the prosperity of the undertakings was the gain of the employees. He would also like to thank the Trustees of the money that was left by Sir George Livesey to be distributed among both Companies for the old employees. It was very gratifying each week, when this money was paid over to the old servants, to see how bright and cheerful it made them.

For the South Metropolitan Company, Mr. F. Whitehead seconded the vote of thanks, remarking that co-partnership was growing very rapidly. During the last two years, a good number of gas companies had adopted the system—nine in 1908, and the same number in 1909. In 1904, there were three co-partnership gas companies; while to-day they had a record of about 26 companies. This progress augured well for co-partnership. They were pleased to see their Chief Engineer (Mr. Doig Gibb) with them that afternoon, and extended to him a right royal welcome.

Mr. Henry Austin, an Employee Director of the South Metropolitan Company, remarked that as this might possibly be his last speech to them in that capacity, he would like to take the opportunity of wishing the co-partners "Farewell, success, and double success." They were reminded that it was 21 years since profit-sharing was started. It had grown up into quite a healthy manhood. Events passed quickly; and change always seemed on the wing. The advent of profit-sharing—now co-partnership—would ever be a landmark in their history. Co-partnership was the gospel of encouragement, because it had enfranchised thousands of working men from labourers to capitalists—an achievement anyone might be proud of. Such a feat brought to their minds a sad reminder of him who, though he was no longer with them in body, was with them in spirit. So that day, in the midst of their beautiful surroundings, they lifted their grateful hearts to the memory of him who was their benefactor and friend—Sir George Livesey. The lapse of time strengthened their affections, and filled the mind with gratitude to him who no longer reminded them of their responsibilities on these welcome and pleasing occasions. Let the years that were gone still be the messenger of peace and goodwill, warning them of their duty to make their position as secure as they could against the intrusion of any element of discord. Let them prove to all that their scheme was the antidote to the hostilities that existed between Capital and Labour—that there was no room in their programme for any element which would arrest the progress made the last 21 years. Also let them continue to show an intelligent thrift, and prove that the Directors had not misplaced their confidence in them. Further let them prove, by continual self-restraint and thoughtful action, that there was not a more intelligent or more prosperous community of workmen in the United Kingdom than the employees of the two Companies who were fraternizing that day.

Next came another employee of the South Suburban Company, Mr. J. E. T. Wilkinson, who spoke of the improved spirit shown by the men under co-partnership. He was followed by Mr. H. Clouder, on behalf of the South Metropolitan Company, who said that, as a preventive of labour troubles, co-partnership still stood unequalled. As an incentive to the men to do their best, he knew of nothing better; as a disperser of the bad feeling which existed in some places between employer and employee (but did not in their case), it was perfect. As had already been remarked, their co-partnership scheme attained its majority this year. He sincerely hoped that most of them would be spared to see its jubilee.

Mr. W. Doig Gibb, the Chief Engineer of the South Metropolitan Company, on being called upon, said that before he ever dreamt that he would be connected with the Company, he yet had sufficient affection for Sir George Livesey to travel specially from Newcastle to London to take some small part in the last sad ceremony. Now he was with them; and he might say that he had no reason whatever to regret his change. He thanked Mr. Whitehead for his welcome to the dinner, and wished also generally to express his appreciation of the very warm welcome he had received from the workmen and officials of the South Metropolitan Company. He had heard quite a lot that day about co-partnership, and he was reminded that it had now come of age. Most of those in the room were perhaps as old in co-partnership as the scheme itself; and therefore, comparing himself with them, he was but an infant in long clothes. Under these circumstances, remembering that "Little children should be seen and not heard," he would not attempt to say anything about co-partnership.

On the proposition of Mr. F. M'Leod, the Secretary of the South Metropolitan Company, seconded by Mr. Butcher, Mr. Hunt was heartily thanked for occupying the chair; and the party then rose, and betook themselves to the grounds.

Port Dairen (Manchuria) Gas Supply.—It is stated in the British Consular report on the Port of Dairen (Manchuria) that, in order to supply the town with gas for cooking, heating, and lighting purposes, plant was laid down in 1909, and was almost completed by the end of the year. It has a capacity of 280,000 cubic feet, which will be sufficient to supply 3000 houses. The number of applications for gas so far is 700. Pipes made in the United Kingdom are to be put down for a length of 23 miles. Cooking ranges, stoves, and mantles have been secured from Germany, from which country the plant was obtained. The retorts are horizontal. Fushun coal is used, and is said to have produced satisfactory results. The residual products will find a market locally or in Japan.

MR. W. R. HERRING AND EDINBURGH.

Appointment as Consulting Engineer.

A Special Meeting of the Edinburgh and Leith Gas Commissioners was held on Thursday last, to consider the report of the Committee appointed a month previously to confer with Mr. W. R. Herring upon the question of his agreeing to continue his services to the Commissioners in the capacity of Engineer.

Lord Provost BROWN, who presided, moved the adoption of the report of the Committee. He said they all seemed to be of opinion that, in the interests of the gas-works, seeing that Mr. Herring did not see his way to withdraw his resignation, he should be appointed their Consulting Engineer. It was the view that, having regard to the fact that the new works at Granton were erected by Mr. Herring, and conducted on principles somewhat different from those carried out at other gas-works, it was very desirable to have Mr. Herring's advice at all times when it was desired. Mr. Herring told them frankly that he was willing to give such services; and there would be presented to them the heads of an agreement under which the works would still have Mr. Herring's supervision, and be continued with very little change. Under this agreement, the first assistant, Mr. A. Masterton, would have charge, and have from time to time the advice of Mr. Herring when it was desired. The report generally recommended: (1) That Mr. Herring should be retained as Consulting Engineer, visiting the works at Granton once a month at least, keeping in touch with the business, and advising the Commissioners generally, at a fee of £500 a year; and that he should also be retained as Consulting Constructional Engineer, at a fee of 5 per cent. on the value of the work executed. (2) That Mr. Masterton should be appointed Engineer for a year at a salary of £600; on the expiry of the year the matter to be reconsidered.

Mr. R. BRYSON, Convener of the Works Committee, seconded. His long connection with Mr. Herring, and his knowledge of the value of his services, made him say without hesitation that, in agreeing to this motion, they were doing the best they could for the Commission. The clause appointing Mr. Herring as engineer for any future constructional work would leave it in the option of the Commission to employ him or not in that capacity as they pleased. The first work that would have to be undertaken would be a new gasholder, to replace one at Cannonmills; but this need not be for a year or two yet.

Mr. PENNELL thought that, in appointing Mr. Herring as engineer for constructional work, they were tying up in a way they had no right to do the hands of future Commissioners.

The LORD PROVOST said Mr. Pennell was quite wrong in thinking so. Future Commissioners had complete freedom under the agreement to give to, or to withhold from, Mr. Herring all such work.

Mr. PENNELL argued that an arrangement such as they wished to make to appoint Mr. Herring as supervising engineer was not likely to work well. If the first assistant was not strong enough to have entire charge, they should advertise for an engineer who would have full responsibility. He moved that they receive the report and remit to the Works Committee to advertise for an engineer to take Mr. Herring's place. No one would smile more than perhaps Mr. Herring himself at the idea that this body of Commissioners thought it necessary that he should inspect the gas-works twelve times a year. He understood that the Engineer of the Glasgow Commissioners, with five gas-works to look after, had a salary of only £1000 a year; and there were not anything like the complaints from consumers that they had in Edinburgh and Leith.

The amendment not being seconded, the motion was carried.

The LORD PROVOST then submitted *seriatim* the heads of the agreement with Mr. Herring. The first of these was as follows: "In consideration of the payment of the sum of £500 per annum by the first parties to the second party, the second party agrees to render service to the first parties as Consulting Engineer of their gas undertaking. For this sum, he agrees to place his knowledge and experience at the disposal of the Commissioners in connection with the working operations at the manufacturing station and elsewhere, and also in connection with the repair or renewal of the plant and appliances comprising the undertaking, paying such visits as he may deem necessary at not less intervals than monthly, and attending such meetings as he may be called to by the first parties." It was further set forth that the consulting engineer is not to be entitled to any expenses he may incur in travelling from and to London to carry out his duties in Edinburgh. Another clause read: "If the second party be appointed Consulting Engineer to the Commissioners, he shall have charge of all additional constructional work, and the extensions of the undertaking. . . For these services, the second party shall be paid by the first parties at the rate of 5 per cent. on the ascertained cost of the respective work," &c. The Lord Provost moved that this should be altered to read that he shall have charge of such additional constructional works and extensions "as the Commissioners may entrust to him."

Bailie CULLEN raised the point whether the wording made it plain Mr. Herring was bound to take up such work as the Commissioners entrusted to him, or whether he had the option of refusing it.

After some conversation, the clause was finally adjusted: "The second party shall take charge of all constructional work and the extensions of the undertaking as the Commissioners may entrust to him."

The LORD PROVOST then formally moved the approval of the agreement. What, he asked, was its financial aspect? Now that the Granton works were completed, they did not require a man of such knowledge and experience as Mr. Herring to give his whole time to them; and they knew, as a matter of fact, that, with the consent of the Commissioners, Mr. Herring had been giving his services outside. Under the agreement, they would get all the supervision that was absolutely required for the works for £500 a year. Mr. Herring's salary at present was £1500. He had a house which was assessed at £150; the upkeep of the grounds cost £110; the taxes were £40—which in all came to £1800. Now Mr. Herring was to get, as he had said, £500 a year; and Mr. Masterton's salary was to be increased £200. This made £700; so that there would be a saving to the Commission of

£1100 a year. They would have this substantial saving without in the slightest degree sacrificing the efficiency of the works.

The motion was then passed; and it was further agreed that the agreement should come into effect on Nov. 1.

RETIREMENT OF TREASURER AND COLLECTOR.

In connection with the retirement of Mr. John S. Gibb, the Treasurer, and Mr. R. Cockburn, the Collector, which takes place at the end of August, the Commissioners placed on record a minute of their appreciation of the long and faithful services of these officials, and their hope that they might long enjoy well-earned retirement.

At a luncheon held afterwards, illuminated and framed copies of the minute were presented to Mr. Gibb and to Mr. Cockburn.

The LORD PROVOST said that, in parting from Mr. Gibb and Mr. Cockburn, the Commissioners wished to convey to them an expression of their sincere regard, and their appreciation of the faithful work both had done for the Gas Commission. When the Edinburgh and Leith Gas Commissioners took over the undertaking of the Edinburgh Gas Company in 1888, Mr. Gibb was Treasurer of the Company, and had been so for the preceding 14½ years. On Aug. 13, 1888, the Commissioners appointed Mr. Gibb their Treasurer; and he had continued to act as such until now—for 22 years. He had thus had 36½ years' service with the Company and the Commissioners. Mr. Cockburn at that same meeting in August, 1888, was appointed Collector. He had been for the 23 years preceding in the service of the Gas Company; so that with the Company and the Commissioners he had a record of 45 years. He proposed the health of Mr. Gibb and of Mr. Cockburn, a toast which was cordially pledged.

Mr. GIBB, in reply, said that during the 36 years he had been with the Gas Company and the Gas Commission, he had never had any serious differences with either his superiors or his colleagues. He thanked the Commissioners for the confidence they had ever reposed in him.

Mr. COCKBURN, in the course of a few words, said it was a very pleasing thing to find that their services had been appreciated by the Commissioners. He trusted the future prosperity of the Commission would be even greater than it had been.

It was stated that Mr. Williams, the new Treasurer and Collector, would begin his duties on Aug. 15, so as to get into harness before Mr. Gibb and Mr. Cockburn left.

GLASGOW CORPORATION GAS DEPARTMENT.

Gas Committee's Report and Accounts.

A Special Meeting of the Glasgow Corporation was held on Monday last week—Lord Provost M'INNES SHAW presiding—for the purpose of dealing with the Gas Committee minutes, their annual report and the accounts from June 1, 1909, to May 31, 1910, and with recommendations as to the disposal of the surplus profit standing at the credit of the gas undertaking. The table of the proposed rates to be charged for gas for the year 1910-11 within the city supply district was also submitted; but, after discussion, it was agreed to defer its consideration until the next meeting of the Corporation. In the course of the meeting, the Lord Provost announced, amid applause, the receipt of the following telegram from London: "Gas Bill—Lords' amendments agreed to; no opposition." In their report, the Committee stated:

The gross revenue amounts to		£879,434
The gross expenditure to	£664,439	
To this is added depreciation written off capital assets	64,103	
		728,542
Balance carried to the profit and loss account		£150,892
The Committee had to meet the following requirements during the year:—		
(1) Annuities on stocks	£21,690	
(2) Contribution to Glasgow Corporation loans fund, in respect of Glasgow Corporation 3 per cent. stock redeemable in 1921, issued in lieu of converted gas annuities	7,866	
(3) Interest on borrowed money and redeemed loans, &c.	60,185	
(4) Sinking fund	45,375	
		135,116
Leaving a surplus on the year's operations of		£15,776
The credit balance as carried forward last year amounted to		£21,471
Adding the surplus shown above of		15,776
leaves to be carried to the credit of next year's profit and loss account the sum of		£37,247

The decreased revenue from the sale of gas is wholly accounted for by the reduction in price of 1d. per 1000 cubic feet made last year.

The amount carried to the sinking fund for the redemption of loans and the redemption or conversion of annuities was £45,375; and the accumulations and interest during the year amounted to £18,051—making the total addition to the sinking fund for the year £63,426. The sinking fund, with its accumulations, now stands at £858,645, of which there has been already applied in the redemption of borrowed money £750,202 of 3 per cent. stock and annuities; leaving still available for either of these purposes the sum of £108,443.

The Committee have pleasure in stating that the market for residuals was more favourable to the Corporation during the past year. The consequent increase of income from this source amounts to £16,185, and is to be attributed to a better price having been obtained per ton, and a greater quantity of coal carbonized. The quantity carbonized during the past year was 686,311 tons, compared with 681,071 tons for the preceding year—an increase of 5240 tons. The average price received per ton of coal carbonized this year was 3s. 10·717d., compared with 3s. 4·821d. the previous year—an increase of 5·896d.

The net sum realized from the sale of coke this year amounts to £101,148; being £845 more than that of the preceding year. It is due to the greater quantity sold per ton of coal carbonized. The total quantity of coke sold last year was 305,120 tons, compared with 280,116 tons for the previous year—an increase of 25,004 tons. The average price received was 7s. 3·09d. per ton, compared with 7s. 8·36d. for the previous year—a decrease of 5·27d. per ton.

The Committee again observe with pleasure a still greater quantity of gas made per ton of coal carbonized, which last year was 10,167 cubic feet, compared with 10,015 cubic feet for the preceding twelve months (an increase of 152 cubic feet per ton). The unaccounted-for gas this year is 8·641 per cent., compared with 9·294 per cent. for the preceding year, or a decrease of 0·653 per cent.—a substantial improvement very gratifying to report.

The following is an analysis of the sale of gas for thepast year as compared with the sale for the previous year:—

	Year 1909-10.		Year 1908-9.	
	Rate per 1000 C. Ft.	Consumption.	Rate per 1000 C. Ft.	Consumption.
	s. d.	Cubic Feet.	s. d.	Cubic Feet.
Within city and suburbs—				
Lighting	2 1	20,077,100	2 4	21,266,800
Do.	2 0	4,768,670,100	2 1	4,663,552,000
Gas-engines	1 9	9,162,700	2 0	7,473,900
Do.	1 8	334,978,900	1 9	316,823,000
Manufacturing	1 9	234,800	..	
Do.	1 8	225,273,900	1 9	221,698,300
Contract gas	2 0	562,857,700	2 1	563,883,870
Within Milngavie area—				
Lighting	3 1	37,300	3 4	33,700
Do.	3 0	18,682,100	3 1	17,144,600
Gas-engines	2 8	376,400	2 9	460,500
Manufacturing	2 8	839,200	2 9	1,058,200
Contract gas	3 0	1,715,550	3 1	1,673,750
Prepayment supply	2 8	14,590,000	2 11	16,487,221
Do.	2 7	339,408,300	2 8	281,111,400
		6,296,904,050		6,112,667,241
Used at works		78,045,800		74,346,200
		6,374,949,850		6,187,013,441

Increase in 1909-10, 184,236,809 cubic feet = 3·01 per cent.

It is very gratifying indeed to observe the substantial increase in the sale of gas recorded above, which is largely due to its extended use for domestic purposes, and also to the rapidly increasing demand for gas on the prepayment system; the increased consumption from this source alone amounting to no less than 56,399,679 cubic feet. The greatest quantity of gas sent out in 24 hours was 38,894,000 cubic feet. The maximum daily make was 34,295,000 cubic feet.

The number of ordinary meters in use on the 31st of May last was 223,889, compared with 225,422 for the preceding year, a decrease of 1533. The number of prepayment meters in use on the same date was 49,957, compared with 43,900, or an increase of 6057. During the year, 32,821 meters were repaired. The number of gas-stoves on hire on the 31st of May last was 52,696, compared with 48,548 for the preceding year—an increase of 4148. At the same date there were also 15,106 small stoves and grillers let out free of charge, compared with 10,380 before, or an increase of 4726. The number of gas heating and cooking appliances sold during the year was 3206. The number of gas-engines in use, and the total horse power for last and the preceding year are as follows: Year 1908-9, 1690 engines, 19,003⅜ B.H.P.; year 1909-10, 1596 engines, 19,027⅛ B.H.P.—being a decrease of 94 engines, or 5·57 per cent., and an increase of 23¾ B.H.P., or 0·12 per cent. Upwards of 17 miles of new mains were laid during the year.

Referring to the Glasgow Gas Act, 1910, which will shortly receive the Royal Assent; the Committee said: "The Act consolidates and amends the Glasgow Gas Acts, 1869 to 1909, and any other Acts relating to the gas undertaking of the Corporation. It confers upon the Corporation some important new powers in connection with the carrying on of the gas undertaking; and the following may be mentioned: The city supply area and supplementary supply area are definitely defined. The equality clause as regards price has been repealed, and an equal-treatment clause under like circumstances substituted therefor, which enables the Corporation to make contracts with large consumers and to grant rebates or discounts to them, to make rebates for prompt payments, and to differentiate between gas for lighting purposes and gas supplied for manufacturing and industrial purposes; to charge for gas for public lamps a lower rate than the price charged to consumers generally; to charge in the supplementary supply district an increased price (the maximum price not to exceed by 50 per cent. the charge for the time being in force for lighting purposes in the city supply district); and to make a charge for meters which the Corporation formerly had to supply free of charge. An equated sinking fund of 2½ per cent. on borrowed money and on the capitalized value of gas annuities in lieu of varying rates under the earlier Gas Acts. The power to establish a reserve fund at a rate not exceeding ½ per cent. on the amount of capital outstanding until the fund is equal to 10 per cent. of the outstanding capital. The reduction of the candle power from 16 to 14 candles."

The accounts for the past financial year show that the expenditure on capital account was £30,073; the largest items being £5946 for pipes and the cost of laying them, £12,471 for gas-meters, and £10,615 for stoves, &c. The total was, however, reduced to £27,861 by deductions in respect of property sold. The balance at the credit of the capital account on the 31st of May was £50,184. The revenue account shows that the sale of gas produced £628,064; residuals yielded £236,988 (being £101,149 for coke and £135,839 for ammoniacal liquor and tar, &c.); the hire of stoves brought in £9069; rent of house

properties and chemical works, £2868; incandescent stair lighting, £1507. The total receipts were £879,434. On the expenditure side, the principal items are: Manufacture of gas, £511,721 (including £339,676 for coal and carriage and £65,136 for repair and maintenance of plant); distribution, £68,345; rents, rates, and taxes, £53,141; management, £15,386—the total expenditure being £664,439. Adding the amount written off for depreciation—£64,103—makes up the total of £728,542. The balance carried to the profit and loss account is therefore £150,892. After meeting sinking-fund charges and the payment of interest and annuities, there is left a balance of £15,776 carried to the surplus profits account (raising the total to £37,247), compared with a deficit of £14,017 before.

The statement of gas made, sold, &c., shows that the total make was 6,977,904,000 cubic feet, divided as follows between the different works: Provan, 2,394,874,000 cubic feet; Dawsholm, 2,544,259,000 cubic feet; Tradeston, 2,038,771,000 cubic feet. Of the total production of gas, 6,374,949,850 cubic feet were sold or accounted for. The make was 10,167 and the sale 9289 cubic feet per ton of coal carbonized.

Debate in the Council.

Mr. M. W. MONTGOMERY, the Convener of the Gas Committee, in submitting their report, remarked that under the Consolidation Bill the old order of things had passed away, and the new had taken its place. Dealing with the accounts, he said the revenue had been £879,434; and after meeting all expenditure, including working costs, interest, depreciation, sinking fund, &c., there remained a surplus of £15,776 on the year's operations. This result was extremely satisfactory, especially when they remembered that in reducing the price of gas last year they anticipated a deficit on this account. This was accounted for by two things—first, an increased revenue from the sale of residual products (the addition from this source alone was £16,000); and, secondly, the larger quantity of gas made per ton of coal carbonized. In the year 1908-9, they made 10,015 cubic feet per ton; last year, 10,167 cubic feet—an increase of 152 cubic feet. As they carbonized 686,000 tons of coal, the Council would see what an extra 152 cubic feet per ton meant. Having referred to the rapid development of the penny-in-the-slot meter, the speaker proceeded to deal with the hiring of gas-stoves, and said there were now 52,696 in use; being an increase of 4148 during the year. It had been a matter of controversy—in their Corporation, at least—as to the wisdom of pushing the sale or hire of these stoves. It had been proved by the experience of other gas undertakings that an extensive use of these appliances was good business. So convinced were some corporations and gas companies of this, that, as an inducement to people to use them, they fitted them up free of expense and free of hire-charge. Glasgow, however, did not go this length. The revenue from gas-stoves amounted last year to upwards of £9000. He was quite convinced that the future progress and development of the gas undertaking would be along the line of other uses for gas besides lighting—uses for which it was a convenient, economical, and efficient agent—he meant heating, cooking, and motive power. In this connection, he mentioned that they had opened extensive show-rooms in Sauchiehall Street, where the latest appliances might be seen. They were also taking part in an exhibition for the promotion of smoke abatement, which would be held in September. Referring to the proceedings in connection with the promotion of the Consolidation Bill, Mr. Montgomery said it came before a Committee of the House of Commons in May last. The treatment of the Bill by the Committee was not sympathetic. Possibly they were influenced by the opposition offered by the surrounding burghs and counties. The attitude of these authorities was a great revelation to him. During the last forty years, Glasgow had supplied most of them on exactly the same terms as themselves. They undertook all the risks, and gave them all the benefits of the skill, management, and energy which were necessary to build up a great and successful undertaking. Under these circumstances, they expected their co-operation and assistance. Instead of this, they received from them the most bitter and unreasonable opposition. Their whole attitude was one of distrust and suspicion of Glasgow, although there was nothing in the proposals under the Bill to warrant such feelings. He believed this opposition was largely official, and was not supported by the people themselves. In the petition which was subsequently presented to the House of Lords in favour of the price clause, a great many signatures of manufacturers outside the city boundary were found; and these firms would reap the benefit attached to the proposals he was about to name. They now knew exactly what was the official attitude of these outside places towards Glasgow; and that was something gained. He referred particularly to Partick and Govan and to the county of Lanark. The House of Commons Committee decided against the Corporation on most points; but notwithstanding this, they took the Bill to the House of Lords, where they got practically everything for which they had contended in the House of Commons. The only thing they did not get was a continuation of the power they had enjoyed for the last forty years—to apply the surplus in reduction of the rates. Though they did not exercise this power, he regretted that it had not been continued. Some of the advantages gained by the Bill were these: (1) The city supply area and the supplementary area were definitely defined. (2) The equality clause as regards price had been repealed, and an equal-treatment clause under like circumstances substituted. (3) Gas for public lamps at a lower rate than that charged to consumers generally. (4) To charge in the supplementary district an increased price up to 50 per cent. over the city price. (5) To charge for meters where the Corporation thought it desirable to do so. (6) An equated sinking fund on borrowed money and on the capitalized value of the annuities. (7) Power to establish a reserve fund. (8) Reduction of the illuminating power from 16 to 14 candles. In conclusion, he said the Corporation had a very satisfactory Bill, harmonizing with the most modern legislation on the subject. Under sufficient control and wise management, and supported by a loyal Corporation, he ventured to predict for the Gas Department a new career, carrying with it prosperity to the undertaking and increased advantage to the citizens.

Mr. NELSON, in seconding the motion, said the prospect for the domestic consumer of gas was very hopeful indeed; and he thought in the course of a few years they might possibly get quite a diminished price as regarded the general lighting of the city, especially for small consumers.

Treasurer GRAHAM said he hoped the Gas Committee would be able to make such an exhibition of gas stoves and appliances as would compel the people of Glasgow to go and purchase them and get them put in for themselves.

Mr. P. G. STEWART, referring to the Consolidation Bill, said he thought the Gas Committee were now in a fair position to get along and to reap benefits from the undertaking, instead of making experiments and extending their wings in the outside districts in the way they had been doing. With reference to the question of gas-stoves, he said there was a cry for a purer atmosphere; and they could only get it by encouraging people to use these stoves.

Bailie ALSTON also thought that, as a means of procuring a purer atmosphere, they should encourage the use of gas-stoves. In his opinion, the time had come when they should consider the question of giving greater facilities for the use of gas.

Mr. MONTGOMERY replied to the remarks which had been made, and the report and accounts were adopted.

The Council then proceeded to consider the recommendations of the Committee in regard to the disposal of the surplus.

Mr. MONTGOMERY said the minutes of that day's Committee meeting stated that it appeared from the annual accounts of the Gas Department for the year ended May 31 last that there was a surplus profit of £37,247 standing at the credit of the department; and it was pointed out that, in terms of section 86 of the Glasgow Corporation Gas Act, 1869, the balance might be carried to the credit of the Corporation for their general purposes. After consideration, it was agreed to recommend that the balance be disposed of as follows: (1) That the sum of £20,000 be paid over to the Corporation for their general purposes, with the recommendation that the deficit on the telephone undertaking, which at present amounts to between £16,000 and £17,000, be recouped to the Common Good therefrom; and (2) that the balance of £17,247 be carried forward to the credit of the current year's accounts of the Gas Department. Mr. Montgomery pointed out that the Corporation had no longer the power, provided the Consolidation Bill was passed, to carry their surplus towards the relief of rates. They considered, in view of the position of the undertaking, that it was now desirable to transfer a portion of the surplus to the common purposes of the Corporation. He would not be in favour of this policy year after year, as it was not a policy which really commended itself to the majority. But they were now in exceptional circumstances; and it was desirable to try to square their accounts in view of the new era upon which the department had entered. The proposal was to transfer £20,000 to general purposes, and carry forward £17,000 to the credit of this year's gas account. He was disposed to make this suggestion, because on the figures on which they were now reckoning they anticipated for this year a deficit of some £18,000. If, therefore, they carried forward the proposed balance, it would provide the department with a sum quite sufficient to meet the anticipated deficiency should it arise. As to the telephone proposal, he thought it was one to which no party, either in the Council or in the city, could take exception. He moved the adoption of the Committee's recommendations.

Mr. NELSON seconded the motion.

Mr. BATTERSBY moved, as an amendment, that the entire sum of £37,247 should be paid over to the Corporation for general purposes. If it were true—and there was no doubt of it now, in view of the telegram from London—that they were coming under the Consolidation Act, and that the table of rates would require to be rearranged at some subsequent meeting, he failed to see why they should not adjust the table to meet the expenditure for the current year. This was the last opportunity they would have of disposing of the surplus; and he failed to see why they should give £17,000 to meet this year's probable deficiency, because there would be outlying districts to participate. There was an important clause in connection with the Bill, to the effect that if there were any deficiency the citizens of Glasgow alone would be held responsible for the payment. He thought, therefore, that the fairest way to deal with the surplus was to put it into the Common Good.

Bailie GUEST, in seconding the amendment, pointed out that as they had not decided on the charges for the year, and as there might be a deficiency of £18,000, he thought this could be quite well put right in considering the proposed charges.

Mr. COSH moved a further amendment, to the effect that the whole surplus should be carried to the reserve fund. He said he thought a good many of them could remember that from time to time sums had been taken from the Common Good for other purposes; and he did not know that there was anything to prevent them taking from the Common Good fund a sufficient amount to liquidate the telephone debt.

Mr. PRATT seconded Mr. Cosh's amendment.

After some discussion,

The LORD PROVOST pointed out that the finding of the Committee was arrived at unanimously; and he said it seemed to him to be a most reasonable recommendation. It was a question of compromise between the proposals of Mr. Battersby and Mr. Cosh; and, in these circumstances, he would appeal to them to withdraw their amendment, and allow the Council to come to a unanimous decision.

The amendments were withdrawn, and the recommendation of the Committee was unanimously adopted.

EXTENSIONS AT THE AMMANFORD GAS-WORKS.

Extensions and alterations of some importance are being carried out in connection with the Ammanford Gas-Works, which, after undergoing considerable vicissitudes, have been remodelled by a new Company; the old works being "scrapped" or improved out of existence. A contract has been entered into with Messrs. Willey and Co., of Exeter, to put in new beds of retorts, purifiers, washers, exhausters, condensers, and a larger gasholder, 60 feet in diameter. The present 6-inch main from the works to the centre of Ammanford—a distance of at least half-a-mile—is being replaced by one 10 inches diameter; and from that point to the boundary of the urban district an 8-inch main

will be continued. Farther on, to a total distance of four miles—in fact, to the top end of Garnant, in the next parish—a 6-inch main will be laid. The different streets of Garnant will have 3-inch or 4-inch pipes laid in them as may be found necessary. A range of artistic gas-standards will light the roads the whole of the distance from the urban boundary to the top of Garnant. These works are to be completed within two years. All the tubes will be of the Mannesmann kind, made at Landore, near Swansea; and all the machinery and appliances will be of the latest types. It is anticipated that there will be a greatly increased demand for gas-stoves, of which about 200 are already in use in the town, and are much appreciated by the colliers, who are able to get a cup of hot tea or cocoa before going out to their work in the pits in early morning. The slot-meter system will be developed, and the maximum price of gas (4s. 3d. per 1000 cubic feet) will, it is calculated, be half that of electricity, with which the urban district is supplied, for the same candle power. As consumption increases, the price is to be reduced; and then gas will become an active competitor against the electric light in the district. During the autumn a gas exhibition is to be held, when the advantages of gas will be fully demonstrated.

LISBURN GAS-WORKS PURCHASE.

The Umpire's Award.

At the Meeting of the Finance Committee of the Lisburn Urban District Council last Thursday, the Town Solicitor submitted the award in the arbitration in connection with the purchase of the gas-works by the Council which he had received that morning from London. Owing to a question as to whether the Gas Company are a statutory or a non-statutory corporation, it was decided that, for the present, it would be inadvisable to hand the award to the Press for publication. The "Lisburn Herald," however, is in a position to enlighten readers as to the figures named in the award. In the event of the Company being declared "statutory," the amount they will be entitled to receive is £31,445; whereas if proved that they are "non-statutory," they will get £34,227. The price originally offered by the Council for the concern (except the property acquired by the Company for extending the works, if necessary) was £28,000. The Editor of the "Herald" says: "Even if the Council should have to give the £34,227, the bargain may be regarded as a not unsatisfactory one." He adds that the foregoing figures were not supplied from an official source, but that they can be relied upon as accurate. It may be remembered that the arbitration proceedings were held in London not long ago, and were reported in the last volume of the "JOURNAL" (pp. 570, 706); Mr. Corbet Woodall and Mr. H. E. Jones being Arbitrators, and Mr. Ram, K.C., Umpire.

GASLIGHT AND COKE COMPANY'S ACCOUNTS.

[For the Half-Yearly Report, see p. 316.]

The accounts of the Company for the six months ended June 30, to be submitted with the Directors' report on Friday, consist of the usual statements, from which we take the following particulars.

The statement of capital (stock) sets forth that the total paid up is £10,264,980; added on conversion, £12,697,710—total amount authorized, £22,962,690. Deducting the amount redeemed, £120,880, the total amount of the Company's existing capital powers is £22,841,810. The statement of loan capital stands thus: Total paid up, £3,097,300; added on conversion, £1,564,405; unissued, £750,000—total amount authorized, £5,411,705.

The capital account shows receipts (with premiums, £1,669,476 8s. 5d.) to the amount of £29,172,991 8s. 5d. The expenditure is shown in the following items:—

Expenditure to Dec. 31, 1909—			
Gaslight and Coke Company			£13,556,245 7 6
West Ham Gas Company			1,093,855 19 8
Expenditure during the half year to June 30, 1910—viz.,			
Buildings and machinery in extension of works	£2,915 8 8		
New and additional mains and service-pipes	17,801 8 7		
Do. do. meters	19,024 15 7		
Do. do. stoves	13,318 18 2		
		53,060 11 0	
		£14,683,161 18 2	
By depreciation of plant	£13,677 17 4		
By depreciation of meters and stoves	49,368 5 1		
		63,045 15 5	
Total expenditure		£14,620,116 2 9	
Nominal amount added on conversion		14,262,115 0 0	
		£28,882,231 2 9	
Deduct amount of capital redeemed under Gaslight and Coke Company's Act of 1903—			
Per previous account	£101,655 0 0		
This half year	19,225 0 0		
		120,880 0 0	
		£28,761,351 2 9	
Balance of capital account		411,640 5 8	
		£29,172,991 8 5	

The balance applicable to the redemption fund and to dividend on the ordinary stock is £929,890 11s. 6d.; and the following statement shows how it is proposed to appropriate it:—

June, 1909.			
£444,779	..	Net balance brought from last account	£489,739 17 9
375,212	..	Net revenue for the half year	440,150 13 9
£819,991			£929,890 11 6
10,000	..	Contribution to redemption fund	10,000 0 0
(£4 13s. 4d. p. ct.)		Dividend on the ordinary stock—	
£377,379	..	£4 13s. 4d. per cent. per annum on £16,179,445	377,520 7 8
£432,612	..	Balance carried to next account	£542,370 3 10

The following is the revenue account:—

Expenditure.

June Half Year, 1909.		£ s. d.	£ s. d.
	Manufacture of gas—		
£624,238	Coal, including all expenses thereon	562,492 18 6	
97,333	Oil ,, less value of oil tar	59,107 3 4	
38,071	Coke and breeze used in the manufacture of carburetted water gas	31,760 5 1	
16,190	Salaries of Engineers and other officers at works	15,587 2 11	
100,872	Wages	97,872 18 6	
12,593	Purification	7,991 14 8	
190,083	Repair and maintenance of works and plant, materials and labour, less received for old materials, £8231 18s. 5d.	184,298 15 6	
	Distribution of gas—		962,110 18 6
49,745	Salaries and wages of officers (including rental clerks)	52,932 4 3	
58,911	Repair and maintenance of mains and service-pipes, &c.	82,863 0 7	
65,635	Repair and renewal of meters	74,216 15 7	
6,308	,, ,, stoves	68,291 0 10	
37,003	Gas fittings, including labour (automatic meter supplies)	35,201 8 10	
			313,534 9 8
22,503	Public lamps—lighting and repairing	..	22,216 19 1
	Rents, rates, and taxes—		
6,141	Rents payable	6,500 19 10	
148,264	Rates and taxes	148,556 5 11	
			155,057 5 9
	Management—		
3,750	Directors' allowance	3,750 0 0	
307	Company's Auditors and Assistant	204 4 0	
9,302	Salaries of General Manager, Secretary, Accountant, and clerks	9,452 1 10	
24,97	Collectors and cashiers	25,413 15 10	
7,261	Stationery and printing	7,162 2 6	
8,306	General charges	4,373 17 1	
			50,356 1 3
	Co-partnership, for 12 months to 30th June, 1910	25,798 17 3	
11,605	*Less* On Account	13,000 0 0	12,798 17 3
1,797	Parliamentary charges	..	4 6 4 6
1,483	Law charges	..	2,582 12 10
..	Charges *re* Quinquennial Re-valuations	..	1,387 10 0
10,100	Bad debts	..	8,542 4 4
500	Depreciation fund for works on leasehold lands	..	500 0 0
25,798	Annuities to officers and workmen, including contribution to officers' superannuation fund	..	26,583 19 2
..	Retiring allowances under the Company's Act of 1909	..	10,507 9 0
1,890	Workmen's compensation account	..	2,314 11 6
..	Stamp and conveyance duties under the Company's Act of 1909	..	285 15 0
	Public officers—		
1,244	Gas Referees and Official Auditor	1,220 17 9	
664	Public testing-stations	633 0 4	
			1,853 18 1
£1,639,594			1,571,048 15 11
607,877	Balance carried to net revenue account		673,219 14 6
£2,247,471			2,244,268 10 5

Receipts.

June Half Year, 1909.		£ s. d.	£ s. d.
	Sale of gas—		
£1,567,552	Per meter, at 2s. 8d. and 2s. 2d. per 1000 cubic feet	1,553,947 10 2	
81,984	Public lighting and under contracts	69,696 19 6	
			1,623,644 9 8
£1,649,536			
35,215	Rental of meters	..	64,110 4 2
51,464	Rental of stoves	..	52,314 10 8
76,364	Rental of fittings	..	49,891 0 5
	Residual products—		
£264,607	Coke, less £36,717 7s. 3d. for labour, &c.	269,347 13 0	
17,024	Breeze, less £7535 1s. 9d. ,,	19,036 15 1	
50,575	Tar and tar products	55,146 2 6	
97,640	Ammoniacal liquor and sulphate of ammonia	105,245 12 8	
			448,776 3 3
£429,846			
£4,680	Rents receivable		4,905 19 9
366	Transfer fees		326 2 6
£2,247,471			2,244,268 10 5

The three statements relating to the reserve, insurance, and depreciation funds stood as follows on June 30: Reserve fund, £94,567; insurance fund, £169,095; depreciation fund, £73,911. The first-named fund consists of the Company's balance on Dec. 31, 1909, £67,902; the West Ham Company's, £15,869; brought from the net revenue account, £10,000; and interest, £796. On the other side, the value of stock allotted to the ordinary stockholders of the West Ham Gas Company is £27,600; a sum of £10,000 is written off on account of depreciation of investments; and the balance is £56,967. The insurance fund is made up as follows: Gaslight and Coke Company, £126,900; West Ham Gas Company, £20,284; amount brought from net revenue account, £20,000; and interest, £1911.

The following statements relate to the working:—

Statement of Coal Used, &c.

Description of Coal.	In Store Dec. 3, 1909.	Received During Half Year.	Carbonized During Half Year.	Used During Half Year.	In Store June 30, 1910.
	Tons.	Tons.	Tons.	Tons.	Tons.
Common	292,558	765,523	922,694	2,177	133,210
Cannel	3,599	..	85	..	3,514
Total	296,157	765,523	922,779*	2,177	136,724

* In addition to this quantity of coal, 6,510,354 gallons of oil and 42 gallons of spirit were used during the half year.

Statement of Residual Products.

Description.	In Store, Dec. 31, 1909.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1910
Coke—tons	7,298	585,226	120,151	453,134	19,239
Breeze—tons	1,599	79,344	10,364	70,034	545
Tar, from coal only—galls.	1,032,851	8,820,775	8,082,018	607,763	1,163,845
Ammoniacal liquor—butts	24,714	288,555	292,323	..	20,946

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Total Quantity Accounted for.	Number of Public Lamps.
	Public Lights and Under Contracts (Estimated).	Private Lights (per Meter).		
Thousands.	Thousands.	Thousands.	Thousands.	
*13,521,085	454,229	11,921,145	12,528,098	49,526
†13,318,818	482,452	11,680,496	12,318,620	52,461

* Including 2,915,567,000 cubic feet of carburetted water gas. † June half year, 1909.

The remaining statement is the balance-sheet, which gives the value of the stores on hand at the close of the half year as follows: Coal, £85 309; oil and petroleum spirit, £29,500; coke, £10,875; tar and ammoniacal liquor and products, £76,647; and sundries, £249,586. The figures this time last year were: Coal, £94,065; oil and petroleum spirit, £47,371; coke, £16,027; tar and ammoniacal liquor and products, £72,111; and sundries, £240,674.

SOUTH METROPOLITAN GAS COMPANY'S ACCOUNTS.

[For the Half-Yearly Report, see p. 316.]

The following are the principal portions of the accounts of this Company for the six months ending the 30th of June.

The first two statements relate, as usual, to the stock and loan capital. The former sets forth that the standard rate of 4 per cent. is payable on £6,011,224 and £418,671 (Act of 1901) of stock; while the latter shows that the loan capital, the rate of interest on which is 3 per cent., amounts to £1,798,994 and £96,451 (Act of 1901). The third statement is the capital account. It stands as follows: Amount received, £5,328,820; nominal amount added by conversion (less premium), £2,996,520—total, £8,325,340. The items of expenditure are as follows:—

Capital account to Dec. 31, 1909		£5,062,627 8 5
Expenditure during half year to June 30, 1910, viz.—		
New and additional mains and services	£1,771 3 1	
New and additional meters	1,262 19 5	
New and additional stoves	1,347 2 4	
		4,381 4 10
Total expenditure		£5,067,008 13 3
Balance		261,811 6 9
		£5,328,820 0 0
Nominal amount added by conversion, less premium		2,996,520 0 0
Total		£8,325,340 0 0

The following is the revenue account:—

Expenditure.

Manufacture of gas—		
Coal into store	£321,959 0 3	
Purification	13,345 2 6	
Salaries of Engineer and Officers at works	14,799 12 4	
Wages (carbonizing)	44,480 2 7	
Repairs and maintenance of works and plant, less £6666 9s. 6d. received for old materials	123,904 12 1	
		£518,488 9 9
Co-partnership for twelve months to 30th June, 1910	£41,133 14 6	
Less on account	16,000 0 0	
		25,133 14 6
Distribution of gas—		
Repair, maintenance, and renewal of mains and service-pipes	£37,303 10 6	
Salaries and wages of officers, including rental clerks	20,223 10 2	
Repairing and renewals of meters	25,083 18 4	
Repairing and renewals of stoves	40,747 16 8	
Repairing and renewals of gas-fittings	37,997 16 10	
		161,356 12 6
Public lamps, labour and materials £20,081 16s. 6d., less £15,021 9s. received for the same		5,060 7 6
Rents, rates, and taxes—		
Rents payable	£1,039 13 7	
Rates and taxes	46,788 16 10	
		47,828 10 5
Management—		
Directors' allowance	£3,092 16 10	
Salaries of Secretary, Accountant, and clerks	3,681 9 6	
Collectors { Ordinary	6,469 16 5	
Collectors { Slot meter	9,2 9 4 11	
Stationery and printing	3,162 13 9	
General charges	9,118 7 10	
Company's Auditors	112 10 0	
		34,876 19 3
Law charges	£1,928 7 7	
Parliamentary charges	111 9 0	
		2,039 16 7
Bad debts		1,570 15 1
Stolen from 4435 slot meters broken open		569 5 2
Pensions and officers' and workmen's superannuation, sick, and accident funds		8,116 18 7
Gas Referees and Official Auditor		343 7 9
Leasehold renewal fund		300 0 0
Total expenditure		£805,434 17 1
Balance carried to net revenue account		219,884 3 6
		£1,025,319 0 7

Receipts

Sale of gas—		
Lady-day at 2s. 2d. per 1000 feet	£377,025 6 4	
Midsummer, at 2s. 2d. per 1000 feet	27,433 14 5	
	£652,459 0 9	
Public lighting	16,738 11 2	
		£669,197 11 11
Meters in use (349,970)—		
Company's meters at rent: Ordinary, 96,674; slot, 242,166	£38,873 9 7	
Company's stoves at rent: Ordinary, 78,515; slot, 199,329; fires, 25,950	30,521 13 4	
		69,395 2 11
Residual products—		
Coke, less labour and cartage	£145,122 13 2	
Breeze, less labour and cartage	4,778 15 0	
Tar and tar products, less labour	31,007 5 6	
Sulphate of ammonia ,, ,,	60,905 17 5	
		244,814 11 1
Rents receivable		1,436 7 6
Transfer fees		88 5 0
Fittings		40,387 2 2
Total receipts		£1,025,319 0 7

Total amount paid in salaries for half year, £38,551 5s. 0d.
,, ,, ,, wages ,, £260,068 9s. 11d.

The net revenue account shows a sum of £268,309 15s. 6d. applicable to dividend on the ordinary stock. Following this are the statements relating to the reserve, renewal, and insurance funds. They show that the balances on June 30 were as follows: Reserve fund, £184,021; renewal fund, £30,619; insurance fund, £99,049. The following statements relate to the manufacturing operations of the Company:—

Statement of Coal.

In Store Dec. 31, 1909.	Received During Half Year.	Carbonized During Half Year.	Used During Half Year.	In Store June 30, 1910.
Tons.	Tons.	Tons.	Tons.	Tons.
248,029	402,471	544,962	1,015	104,523

Statement of Residual Products.

Description.	In Store Dec. 31, 1909.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1910.
Coke—cwt.	172,620	6,743,622	1,681,836	5,097,826	136,580
Breeze—yards	11,197	122,903	51,613	75,710	6,777
Tar—gallons	419,308	5,251,510	5,265,379	32,031	373,408
Ammoniacal liquor—butts	12,195	202,845	208,236	..	6,804

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Total Quantity Accounted for.	Number of Public Lamps.
	Public Lights (estimated).	Private Lights (per Meter).		
Thousands.	Thousands.	Thousands.	Thousands.	
6,441,516	166,284	6,124,448	6,366,799	23,899 incandes't 11 flat flame

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, £63,636; coke and breeze, £4514; tar, sulphate, and ammoniacal liquor, £31,964; and sundries, £298,473. The figures this time last year were: Coal, £77,211, coke and breeze, £14,083; tar, sulphate, and ammoniacal liquor, £36,778; and sundries, £288,911. A sum of £37,419, workmen's bonuses and savings, has been deposited with the Company; and the total of the officers' superannuation and guarantee funds is £53,705. The figures last year were £45,232 and £50,659.

SOUTH SUBURBAN GAS COMPANY.

Half-Yearly Report and Accounts.

The following is the report of the Directors of the Company for the six months ended June 30, which, with the accounts for this period, will be presented at the half-yearly general meeting next Friday.

The accounts show that, after providing for the debenture interest and including the amount brought forward from last half year, the balance available for distribution is £30,284 7s.; and the Directors recommend payment of dividends at the rate of 5 per cent. per annum on the 5 per cent. preference stock, and at the rate of £5 13s. 4d. per cent. per annum on the ordinary stock, carrying forward to next half year £11,642 13s. 8d.

The comparatively mild and open weather which prevailed at the beginning of the year was attended by a falling-off in the consumption of gas; but this was followed by a substantial recovery during the later months of the half year. The return for the whole period shows the small reduction of 0·88 per cent., compared with that for the corresponding period of last year.

There was an increase in the number of consumers during the half year, and a continuance in the demand for domestic gas-heating appliances suitable to the season; while improved high-power lamps fitted with inverted incandescent burners are finding considerable favour for outside shop and other lighting.

Improved returns for residuals and a substantial reduction in the cost of coal have more than counterbalanced the loss of revenue, due to a slight extent to less consumption, but chiefly to the reduction in price (of 1d. per 1000 cubic feet) which took effect on the 1st of July last year, and benefited consumers during the year to the extent of £5492.

A further improvement in carbonizing results forms a gratifying feature of the half-year's working. The average production of gas per

ton of coal carbonized exceeds all previous records of the Company; and the cost of carbonizing labour now ranks among the lowest in the kingdom.

The unrest among the miners caused by the operation of the Coal Mines Regulation (Eight Hours) Act has affected the price of coal; and the current year's supplies have had to be contracted for at an advance upon last year's rates.

The bonus paid to employees under the Co-Partnership Scheme is regulated by the selling price of gas, and now amounts to 6¾ per cent. upon the earnings of each co-partner, or a total of £3462 for the complete year ended on the 30th of June last. This is the largest amount yet divided; and the Directors are of opinion that it is money well and judiciously expended—being fully convinced of the great co-operative value of co-partnership, and that to it is attributable in no small degree the continued success of the operations of the Company.

The accounts accompanying the report show that the total expenditure on capital account at the close of the half year (including a nominal amount of £202,500 added by conversion) was £801,555, or £29,808 less than the receipts, inclusive of £49,305 premium capital—£831,363 in all. Only £776 was expended on capital account in the half year; being £359 on new mains and service-pipes, £105 on new and additional meters, and £312 on new and additional gas-stoves. The revenue from the sale of gas was £83,844; the rental of meters and stoves produced £6766; the sale of residuals, £29,449; and the total receipts were £120,183. The following were the principal items of expenditure: Manufacture of gas (including £42,606 for coal and £18,121 for maintenance of works and plant), £66,765; distribution, £17,142; management, £4820; rents, rates, and taxes (£5084) and miscellaneous items bringing up the total to £97,541. Among these items is a sum of £1839 charged on account of the Co-Partnership Scheme. The balance carried to the net revenue account is £22,642; and the amount applicable for dividend, as stated in the report, is £30,284.

The statements as to working show that 59,300 tons of coal were carbonized in the half year. The quantity of gas made was 711,494,000 cubic feet, of which 696,654,000 cubic feet were sold and 706,258,000 cubic feet were accounted for. The residuals were: Coke, 711,600 cwt., of which 137,419 cwt. (estimated) was used in manufacture; breeze, 16,073 yards; tar, 547,652 gallons; ammoniacal liquor, 15,999 butts—the make of sulphate of ammonia being 650 tons.

TOTTENHAM AND EDMONTON GAS COMPANY.

Half-Yearly Report and Accounts.

At the Half-Yearly Ordinary General Meeting of the Company on Saturday, the Directors will report an increase of 5·5 per cent. in the sales of gas in the six months ended the 30th of June, compared with the corresponding period of 1909. There was an addition during the twelve months of 3346 consumers, and an increase of 2397 in the number of cooking and heating stoves. The accounts accompanying the report show that £7374 was expended on capital account in the half year; £2000 being for new buildings and manufacturing plant, £3134 for new mains and service-pipes, including laying and other work connected with distribution, £828 for meters, and £1431 for new cooking-stoves. A sum of £1000 was written off on account of a demolished gasholder. The sale of gas produced £89,491; the rental of meters, stoves, and fittings and the maintenance of incandescent mantles, £17,243; residuals brought in £20,547; and the total revenue was £127,315. The expenditure on the manufacture of gas was £65,405, including £35,460 for coal, £8519 for oil and coke used in making water gas, and £14,511 for the repair and maintenance of works and plant; on distribution, £21,974; on management, £4354; and for the co-partnership scheme, £1499—the total expenses being £104,099, leaving £23,216 to be carried to the profit and loss account. The amount available for distribution, with £20,681 brought forward, is £39,320; and, as mentioned in the "JOURNAL" last week, the Directors recommend the payment of the full statutory dividends of 7 and 5¼ per cent. per annum on the "A" and "B" stocks, compared with 6¾ and 5¾ per cent. respectively a year ago—the increased dividends being due to the reduction of 1d. per 1000 cubic feet in the price of gas which took place on Jan. 1 last. The dividend will absorb £16,166 and leave £23,154 to be carried forward. In view of the necessity for providing large sums from time to time for the renewal of costly plant, the Directors have commenced a renewal fund, and place £3000 to its credit.

The working statements in the account show that 47,460 tons of coal and 528,731 gallons of enriching oil were used in the production of 798,713,000 cubic feet of gas, of which 764,931,000 cubic feet were sold and 779,977,000 cubic feet accounted for. The residual products were: Coke, 28,476 tons, of which 6594 tons were used for making coal gas, and 4100 tons 17 cwt. for producing carburetted water gas; breeze, 5584 chaldrons; tar, 504,382 gallons; ammoniacal liquor, 13,183 butts. The quantity of sulphate made in the half year was 442 tons 14 lbs.

North Pembrokeshire Water and Gas Company.—The ordinary general meeting of this Company was held on Monday last week—Mr. R. Barnes in the chair. In moving the adoption of the report, he said there was a profit of £543, against £190 the previous year. After paying the debenture interest, there was a balance of £170 carried forward to the profit and loss account. The Directors were hopeful that at the end of the present year the balance would be considerably increased. Their difficulty had always been that they had no working capital. This had been pointed out to the shareholders on previous occasions; but no further capital was subscribed. The position of the Directors had thus been rendered difficult, more particularly in respect of making extensions. So far as the water supply was concerned, arrangements had been made with some consumers on buildings to supply sufficient money to enable the Company to lay the mains; and this money was paid out of the rental for the water afterwards supplied. The gas position was difficult, as gas cost a considerable amount to make. Without working capital, it was really impossible for them to go on with any large extensions. The report was adopted.

MANCHESTER CORPORATION AND THEIR OFFICIALS.

Committee's Report on Salaries and Conditions of Service.

At the Monthly Meeting of the Manchester City Council to-morrow (Wednesday), the Conditions of Service Report will be submitted for discussion. The general impression is that the report (a summary of which as affecting the Gas Department appeared in last week's issue) will be referred to the various Committees for consideration, and a day set apart for the Council to finally deal with the matter. The changes proposed are of so far-reaching a character that it is felt ample time should be given the Committees chiefly concerned to deal with the recommendations of the Special Committee as they affect their separate departments.

The views of the officials affected by the report are voiced through the columns of the "Journal of the Municipal Officers' Guild"—an organization which must not be confounded with the Municipal Employees' Union, the leaders of which suggest that candidates be put forward at the next municipal elections in opposition to those members of the Council who have been concerned in the preparation of the report. The Municipal Officers' Guild dissociate themselves from this suggestion. An impression prevails in certain quarters that the report deals with the workmen in the employ of the Corporation as well as the Town Hall officials. This is not so. The Committee dealing with the workman's side have not completed their labours. The Municipal Officials' Guild regard it as unfortunate that the information as to civil service conditions and the methods adopted in cities similar to Manchester could not be utilized. In their report, the Special Committee expressed regret that "a common basis hardly existed for comparative purposes." The Officials' Guild welcome the recommendation as to competitive examinations for those who desire to enter the service of the Corporation, as it will compel all to enter through the same door, and prevent that gentle pressure which is still exercised by some members of the Council and friends in favour of particular candidates. A compulsory retiring age, with a pension, would be welcomed by the officials; and the Guild, having secured a considerable amount of information regarding the various superannuation schemes in operation in other municipalities, railway companies, banks, &c., are prepared to lay the same before the Committee with their views. It is contended that a report dealing with revision of salaries and conditions of service is incomplete if not containing a retiring allowance scheme, and leaves the question in a state where a just decision is impossible. It is argued that the new system will check initiative and damp all enthusiasm that a man may have in his own particular sphere. There are men in the service of the Corporation with two years' increases overdue; and resignations are already beginning to appear from persons who, the chairmen and chief officials know, cannot be replaced until the newcomers have been established for at least a couple of years. The Officials' Guild suggest that the Council should allow the recommendations to be referred to the different Committees concerned, since they alone know the value of the services rendered.

Councillor Pinder has given notice that he will move at the Council meeting that the report be referred to the various Committees concerned, with instructions to consider such portions as deal with their respective departments, and to report thereon to the Council.

In January last the Gas Committee's recommendations for increases in salary were, along with all the others, deferred by resolution of the Council, pending the report of the Special Committee on Conditions of Service. It was recommended that the salary of Mr. J. G. Newbigging, the Chief Engineer, be advanced from £1100 to £1200; that of Mr. J. R. Hill, Manager at the Bradford Road Station, from £450 to £475, with a maximum of £500; that of Mr. F. P. Smith, Accountant, from £400 to £425, with a maximum of £500; that of Mr. G. W. Tooley, Manager at the Rochdale Road Station, from £375 to £400, with a maximum of £450; that of Mr. T. Williams, Chief Cashier, from £375 to £400, with a maximum of £500; and that of Mr. F. J. Caldecott, Chief Rentals Clerk, from £350 to £375, with a maximum of £400.

ACCRINGTON GAS AND WATER SUPPLY.

We have received from Mr. W. B. Rhodes, the Accountant of the Accrington District Gas and Water Board, the report of the General Manager (Mr. Charles Harrison) on the working of the two undertakings of which he has the supervision, together with the accounts for the year ended the 31st of March. They furnish the following particulars.

The quantity of gas made in the period covered by the report was only 316,000 cubic feet more than in the preceding year; but the production of 426,619,000 cubic feet was achieved with a carbonization of 2095 tons of coal less. The working expenses were also lower—as to the extent of manufacture, £752, of which £328 was saved in wages, and distribution by £201. This, Mr. Harrison remarks, is evidence not only of the care exercised by the Board in the purchase of coal, but also of the great care of the works managers, both at Accrington and Great Harwood, and of the superintendent of the distribution department (Mr. Roberts). The unaccounted-for gas was 2,722,350 cubic feet less last year than in 1908-9. The gross profit on the gas undertaking was £18,656; and the surplus, after meeting all obligations, was £2081. The consumers of gas number 20,070—an increase of 398 for the year. The number of prepayment meters is 7016, or 652 more. There are 5235 cookers, 1473 gas-fires, and 695 gas-boilers in the district—a total of 7403, and an increase of 523 for the year.

The working statement in connection with the gas undertaking contains the following particulars: Coal carbonized, 38,335 tons; gas made, 426,619,000 cubic feet, or 11,129 cubic feet per ton; gas sold, 384,995,400 cubic feet, or 10,043 cubic feet per ton of coal; coke or breeze saleable 8·75 cwt. per ton; tar made, 10·53 gallons per ton; ammoniacal liquor made, 30·31 gallons per ton. The outstanding loans amount to £339,755 8s. 4d., or at the rate of £8 17s. 3·07d. per

ton of coal, 15s. 11·13d. per 1000 cubic feet of gas made, and 17s. 7·8d. per 1000 feet sold. The capital value of the works and plant is £406,188; and the gross profit (£18,656) averages £5 9s. 9·88d. per cent. upon it.

The revenue from water amounted to £23,435—an increase of only £33 over the previous year, accounted for by the reduced quantity used for trade purposes. The increased revenue for water supplied for domestic purposes was £376. The gross profits amounted to £15,541; and the deficiency is £5280. The number of consumers added during the year was 241. The total quantity of water sent into the district during the year was 756,025,000 gallons, equal to a supply of 22 gallons per head per day for 90,000 people.

LEYDEN MUNICIPAL GAS UNDERTAKING.

Report for the Year 1909.

We are indebted to the courtesy of Heer N. W. van Doesburgh, the Manager of the Leyden Municipal Gas and Electricity Works, for a copy of the report of the working of these undertakings for the year 1909. We have abstracted from it the following particulars relating to the gas undertaking.

In consequence of the death of the former Assistant-Manager, Heer F. A. Holleman, jun., the Gas and Electricity Committee appointed Heer H. A. Blom as Assistant-Manager of the electricity works, and Heer E. J. F. Thierens as Assistant-Manager of the gas-works. Land was purchased in the course of the year for the extension of the two works. A contract was made and ratified on Jan. 27 last for the supply of gas to the suburb of Leiderdorp. Contracts were made conjointly with the Hague municipal gas-works for the supply in the year ending March 31 last of 21,600 tons of Westphalian and 4000 tons of English gas coal. A contract for three years from April 1 last was made for the delivery annually of 600 tons of Texas gas oil, and another contract for the delivery of 100 tons of Java oil per annum. The prices at which these raw materials were purchased were considerably below the estimates of July, 1908; and as a result of the saving thereby effected, the Municipal Council determined, in June last, to pay off from the profits of the gas undertaking 5 per cent. of the loan capital instead of the usual 2½ per cent. The accounts of the gas undertaking show a gross profit for the year of 130,208.82 florins (£10,850), and after paying interest and redemption charges, a net profit of 42,524.07 florins (£3544). The profit realized shows a considerable increase on that of the preceding year.

The carbonizing plant remains the same as in the previous year (*vide* "JOURNAL," Vol. CVII., p. 196). A new exhauster and a new "Standard" washer-scrubber have been installed during the year, and various other additions have been made to the works' plant. The mains laid during the year had a length of 3666 yards; making the total length of pipes in the distributing system about 48 miles. The make of gas per ton of coal was 11,116 cubic feet, which is slightly lower than the make the previous year. The coke produced amounted to 70·12 per cent., the tar to 3·982 per cent., and the ammonia to 0·2277 per cent. by weight, of the coal carbonized. The coke consumed in the retort-furnaces amounted to 18·12 per cent.; while 6·48 per cent. was used in the water-gas plant. The materials employed to produce 1000 cubic feet of carburetted water gas averaged 22 lbs. of oil and 54 lbs. of coke and breeze, inclusive of the boiler fuel.

The total make of gas during the year was 9,575,621 cubic metres (338,172,631 cubic feet), of which 264,944,940 cubic feet, or 78·35 per cent., was coal gas, and the remaining 21·65 per cent. carburetted water gas. The total make is 1·7 per cent. less than in 1908. The amount of gas sold, however, is slightly higher than in the previous year; the unaccounted-for gas having been reduced from 5·39 per cent. in 1908 to 3·55 per cent. in 1909. The maximum day's make of gas amounted to 1,420,833 cubic feet, of which 1,075,196 cubic feet was coal gas. The minimum make of gas in a day amounted to 452,857 cubic feet. No change was made during the year in the price of gas, which was equivalent to about 2s. 7d. per 1000 cubic feet by ordinary meters and 3s. 1d. per 1000 cubic feet by prepayment meters. In the outlying district, a higher price was charged. The consumption through ordinary meters shows a reduction of 2·9 per cent. as compared with the previous year; but the consumption through prepayment meters has increased by 10·63 per cent. The number of ordinary meters in use at the end of the year was 6296, and the number of prepayment meters 3997. The average consumption of gas, exclusive of public lighting, was 4788 cubic feet per head of the population. Public lighting absorbed 5·22 per cent. of the output of gas. The high-pressure supply of gas to Sassenheim and Voorschoten accounted for 3·11 per cent. of the quantity made, compared with 2·12 per cent. last year. The mean calorific power of the gas distributed was 580 B.Th.U. per cubic foot; while its specific gravity averaged 0·480, and ranged from 0·392 to 0·545. The proportion of sulphur in the gas averaged 29 grains per 100 cubic feet; the maximum being 35 grains. The ammonia amounted, on the average, to 0·142 grain per 100 cubic feet of gas, and the carbonic acid in the gas to 2·6 per cent. by volume. A slight increase was made during the year in the number of lamps employed for public lighting.

Projected Amalgamation of Southport and Birkdale.—For the first time in its history, there was a few days ago a majority of the General Purposes Committee of the Birkdale Urban District Council in favour of amalgamation with Southport. Four conferences between representatives of the Southport Corporation and the Council have resulted in terms being submitted to the following effect: The amalgamation to date from Jan. 1, 1911; the number of Southport councillors to be increased by 15 and the aldermen by five; the rates to be uniform, also the charges for gas, except that, in accordance with the terms upon which Birkdale and Ainsdale amalgamated, Ainsdale has a preferential rate for ten years. Compensation is to be paid to officers and workmen disturbed; and those retained are to be paid at Southport rates.

SUFFOCATING FUMES FROM ELECTRICITY CABLES.

The Long Acre Affair.

At the Meeting of the Holborn Borough Council last Wednesday, the Public Health Committee reported that early on the morning of the 10th of June, the police gave notice to the Borough Surveyor of an escape of gas in several of the houses in Neal Street, Long Acre, and that a number of the occupiers had been poisoned thereby and removed to hospital. The Surveyor communicated with the Gaslight and Coke Company, whose servants proceeded to investigate the matter. No escape of coal gas, however, was found; but on opening the road in front of some of the houses, the ground was found to be very hot, and the bitumen around the cables of the Charing Cross, West End, and City Electricity Supply Company in a molten condition. The Surveyor communicated with the Company, who found about 150 feet of their cables opposite the houses of Nos. 48 to 68 had been fused. The Medical Officer of Health, having made some inquiries, suggested to the Town Clerk the desirability of an investigation being made into the matter by a Government Department; and the Town Clerk addressed a communication thereon to the Home Office. The letter was forwarded to the Local Government Board, who requested Dr. Bond to make the investigation. It appears that eleven patients were removed to the hospital—six being from No. 56, three from No. 60, and two from No. 62; and, in addition, some other occupants of the houses informed the Medical Officer of Health that, though they did not go to hospital, they suffered more or less. Dr. Mott, of the Charing Cross Hospital, who dealt with the cases, expressed the opinion that the symptoms were those of carbon monoxide poisoning. The Medical Officer of Health has informed the Committee that in the houses where the cases occurred the front walls of the basements were defective, and the front areas and stall-boards quite enclosed, so that the gas could easily enter the houses. At the other houses, there were either open gratings over the front areas or in the stall-boards, or the front walls were well concreted, or there was a combination of these conditions, so that the gas could not enter these houses in any quantity. The Medical Officer of Health is now reporting in detail on the matter to the Local Government Board; and the Committee have requested him to incorporate in his report an expression of their opinion that the matter is one of extreme importance, and their hope that the Board will see their way to advise as to the steps it may think desirable to take with a view to preventing as far as possible any recurrence of similar dangers. The matter, it may be remembered, was commented on in the "JOURNAL" at the time, when it was suggested that the trouble had been caused by the burning of the bitumen insulation of the electricity cables, and not by escaping coal gas as was generally supposed.

PUBLIC LIGHTING OF HOLBORN.

At the Meeting of the Holborn Borough Council last Wednesday, a report was presented by the Works and General Purposes Committee dealing with the improved lighting of the thoroughfares of the borough. It furnished the following information on the subject.

On the 23rd of March last, the Committee reported that they had decided to accept offers from several firms to erect (on trial) improved gas-lamps with inverted burners in various parts of the borough; and that they would, in due course, report as to the results obtained. At the same time the Council requested them to consider and report on the cost of an electric lighting scheme for some of the main thoroughfares. The Committee held a special meeting on the 21st ult. for the purpose of receiving a report from the Sub-Committee appointed by them to go fully into the matter.

With regard to the question of adopting the electric light, estimates were prepared by the Borough Surveyor (Mr. E. F. Spurrell) of the cost of alternative systems applied to High Holborn and New Oxford Street only, as follows:—

	Estimated Candle Power.	Estimated First Cost.	Estimated Annual Cost.
1.—By existing lanterns adapted	18,000	£75	£483
2.—By new standards for arc lighting	40,000	800	680
3.—By new suspended lamps for arc lighting across the street	40,000	290	680
4.—By flame arc lighting	120,000	1000	680

In order to instal a system of lighting by high-pressure gas in these two thoroughfares, it would be necessary to lay special mains and erect new columns similar to those in Kingsway (where the system is installed) at a cost of £18 per lamp. The Sub-Committee expressed the opinion, in which the full Committee concurred, that the adoption of either electric light or lighting by gas at high pressure would involve considerable expense and disturbance of the pavements; and that by the adoption of improved burners and lanterns on the existing columns a satisfactory improvement in the lighting could be effected at a minimum cost.

Dealing with the experiments with inverted burners, the Committee stated that the trial lamps were fixed by eight different firms during the months of April and May last in various parts of the borough, and were placed so as to afford an opportunity for a fair test of their respective illuminating powers being carried out. The results of photometrical tests made under the supervision of the Borough Surveyor had been laid before them, from which it appeared that the best effects were obtained from the lamps erected by Messrs. Kempton and Co. and Messrs. Anderson and Co., which gave respectively 27·2 and 26·5 candle power per cubic foot of gas consumed in a two-light burner. The cost of adapting any of these improved burners to the existing lanterns was estimated at 15s. each for a two-light burner; and as there were 1896 lanterns in the borough (excluding the 28 high-pressure lamps in Kingsway, which it was not proposed to alter), the cost of the conversion, allowing for a certain number of lamps with more than two burners, would be about £1478, and the cost of gas and

maintenance of each double-burner lamp consuming in combination 7 cubic feet of gas per hour would be £3 19s. 9d. per lamp per annum. The cost of the whole of the lamps when converted, was estimated, at the present price of gas—viz., 2s. 2d. per 1000 cubic feet—as being about £8000 per annum.

While these experiments were in progress, an offer was received from the Gaslight and Coke Company, who are the present contractors for lighting the public lamps of the borough, to undertake the conversion of the whole of the existing burners to the inverted burner system, under an arrangement whereby the Council would incur no increased expenditure for lighting, and no capital outlay. The letter conveying the offer was signed by the Chief Inspector (Mr. F. W. Goodenough), who submitted the following scheme: The borough is at the present time lighted by 1767 single-burner, 71 two-burner, and 24 three-burner lamps; giving a total estimated illuminating power of 140,000 candles. The cost of these lamps to the Council for the year ended March, 1910, was believed to be about £6700. The Company's suggestion was that 1030 of the lamps should be fitted with one inverted burner of 80-candle power; that 500 lamps should have two similar inverted burners, giving 160-candle power each; that 132 new circular lamps, each fitted with three inverted burners, giving 240-candle power, should be supplied and fixed on the existing columns; and that 200 new circular lamps, each fitted with five inverted burners, giving 400-candle power, should be supplied and fixed on columns extended so that the light would be 15 feet from the ground. This would give a total lighting power of more than 260,000 candles in all. Having specified the thoroughfares in which the five, three, and two burner lamps respectively would be located, Mr. Goodenough said: "If given a contract for ten years in respect of this number of lamps, the Company would be prepared to carry out, at its own cost, the whole of the installation work, including the supply of the necessary lamps, and to charge the following inclusive prices per annum for supplying gas to, lighting, extinguishing, cleaning, painting, repairing, and maintaining, the whole of the lamps: Per one-burner lamp, £2 7s. 6d.; per two-burner lamp, £3 18s.; per three-burner lamp, £6; and per five-burner lamp, £7 10s. The total annual cost would therefore be £6688, or practically the same as in the last financial year, while the illuminating power would, as shown above, be increased 75 per cent." Mr. Goodenough pointed out that the scheme was based upon exceptionally liberal terms, and expressed the hope that it would meet with the approval of the Committee and the Council.

Continuing their report, the Committee said: "The Company estimate the capital outlay to be incurred by them at approximately £5000; and in order to recoup them, they require a ten-years' contract. But Mr. Goodenough, who was present at our meeting, said the Company were willing to give the Council the option of determining it at the end of five years on payment of the sum of £2500, or at the end of seven years on payment of £1500. Further, for an additional payment of 2s. 6d. per annum for each one-burner lamp, the Company are prepared to provide all new lanterns, which would be approximately an addition of £129; making the annual payment to the Company £6817. Comparing the two proposals, the following are the results:—

Conversion of existing lanterns by the Council—	
Cost of conversion	£1478
Annual cost of upkeep and lighting, 326,000-candle power	8000
Conversion and maintenance by the Company—	
Annual payment, 260,000-candle power	6817

In the first case, no new lanterns would be provided; but by the Company's scheme all new lanterns would be fitted, and would become the property of the Council. It should also be borne in mind that the price of gas is now as low as it has ever been, and that should its price be raised, the estimate of the Council's expenditure under the old system would be correspondingly increased. The offer of the Company is, in our opinion, a favourable one to the Council, even should they desire at the end of five or seven years to determine it, and pay the sum required by the Company to recoup them for their loss of anticipated profit. . . . The present contract for maintenance and lighting, entered into on the 1st of April last with the Company, is for twelve months, and could be conveniently determined on the 30th of September next; so that the new system could come into force on the 1st of October. The acceptance of the offer would not involve any alteration of the estimates for the current year." The Committee concluded by recommending that the offer of the Gas Company should be accepted for the supply of all new lanterns, conversion of burners to the inverted system, maintenance, lighting, extinguishing, and supply of gas to the public street-lamps in the borough, painting, and all other conditions contained in their existing contract, for a period of ten years from the 1st of October, 1910, for the annual payment by the Council of £2 10s., £3 18s., £6, and £7 10s. per one, two, three, and five burner lamp respectively; and that the agreement to be entered into with the Company should be determinable at the end of the first five or seven years on payment by the Council of the sums of £2500 or £1500 respectively.

Owing to the absence of the Chairman of the Committee (Alderman Nolan Glave), the report was presented by the Vice-Chairman (Mr. Philip A. C. Wilkinson). The Committee invited the attendance at their deliberations of Mr. Howard Foulds, in the interest of electric lighting.

At the outset of the proceedings, over which the MAYOR (Alderman Max Clarke, J.P., F.R.I.B.A.) presided,

The TOWN CLERK (Mr. Lionel J. Walford) read a letter written by the Metropolitan Electric Supply Company, Limited, who have powers over the whole of the Borough of Holborn, intimating their willingness to tender for the lighting, and expressing their intention to carry it out equally as cheaply as the Gas Company. He said he understood that all the members had received a similar letter the previous day.

Mr. FOULDS suggested that the report should be referred back, as competitive prices had not been obtained from the Electric Light Company; and until their terms were obtained, the Council should not tie themselves to the Gas Company for ten years. It seemed to him that the Company were unduly favoured by the Council when these lighting contracts were before them.

The MAYOR objected to this statement being made.

Mr. FOULDS withdrew it; and went on to say that high-pressure gas would mean the disturbance of the streets for laying the mains, while the Electric Light Company had already their mains in position.

Alderman C. E. GREEN said from his experience in Hampstead it was impossible for the Electric Light Company to go in for street lighting without laying a special main or cable for it, thus disturbing the streets; and if it had proved a nuisance in Hampstead, what a chaos it would cause in a place like Holborn, with its streets full of traffic. The question of public lighting was not a thing that could be played with. The City of London, after changing from gas to electric light, had found that the latter was not efficient, and had to go back to gas. They in Holborn did not want to make this mistake.

Alderman DIBDIN thought the report should stand over in order to enable the Council to consider the question more carefully, and the Committee to get further information. He said it would be a great mistake if the Committee did not obtain competitive prices.

Mr. WILKINSON, in reply, said the Committee had given serious consideration to the question before the Council, and hoped the report would not be referred back. All the neighbouring boroughs were now entering on fresh lighting contracts in connection with the new inverted gas-burners. Finsbury, Southwark, Bethnal Green, the City of Westminster, the City of London, and others, had adopted these burners, which gave such good results; and Holborn must fall into line.

On being put to the vote, six were in favour of the Committee's recommendation, and fifteen against it. The report was then unanimously referred back to the Committee for further consideration, to enable them to obtain prices from the Metropolitan Electric Supply Company.

ELECTRICITY SUPPLY IN BERMONDSEY.

An Unprofitable Undertaking.

At the Meeting of the Bermondsey Borough Council last Tuesday, a discussion took place on the accounts of the electricity undertaking for the past financial year, which, as stated in the "JOURNAL" last week, show that, on an outstanding loan indebtedness of £152,973, there is a surplus of only £43, against an estimated one of about £500.

Alderman HARBORD, while regretting the small surplus, said there were many causes for it. No doubt a larger amount was spent than was absolutely necessary; but the Lighting Committee had hopes that there would be a greater demand for the energy in future. They had to compete with a Company who in some instances had estimated for a supply of electricity at one or two points below them; and consequently the Council had lost the business. Everything had been done to increase the value of their plant; and they had brought down the cost of production from 1·58d. to 0·71d. per unit. The working expenses had been reduced nearly one-half. They were paying off an enormous amount of their capital expenditure; while the opposing Company had to pay dividends. If the Council were an ordinary trading company, they would have paid 6½ per cent. dividends.

Mr. A. LAYTON pointed out that the Council had sold 402,108 more units than in the previous year. It might, he said, be exceedingly satisfactory; but it did not produce an equivalent increased revenue. Though they had sold all these additional units, they were really £462 worse off than the previous twelve months. This did not appear to him to be satisfactory. He did not see where the anticipated surplus of £600 this year would come from, and was afraid their prices must be increased.

Mr. F. E. EDDIS said he was surprised the undertaking could only show a surplus of £43 on last year's working. He maintained that there ought to be a depreciation account; but when he drew the attention of the Auditor to the omission, he replied that the Council were paying back a certain amount of their loans and did not need a depreciation account. The small profit of £43 was obtained without providing for any depreciation. In the net revenue account they had a deficiency of £1227, which in the general balance was put down as an asset. If they debited adverse balances as assets, how could they get a true return?

Alderman HARBORD said the item £1277 was really an asset. The Committee had allowed £2997 for law costs, and had only spent £1720; so that they had a balance of £1277. They had set aside £3919 for depreciation.

Mr. E. STICKLAND said the undertaking was kept going by the current sold to the Council, who paid to the undertaking £5729, or one-third of the whole proceeds. In the accounts they had a rare juggling of figures; and he could not see how they could go on and make profit without increasing their prices. They charged the Council 2½d. per unit, yet they were selling to other people at ⅜d. per unit current which cost 1½d. per unit to produce. If a company were supplying the Council with electricity, they would at once stop, and go back to gas. He proposed that the charge should in future be 1½d. per unit.

Colonel BEVINGTON seconded the proposition.

Alderman WILLS pointed out that the outstanding loans amounted to £152,973, and that they had made a profit of £1096, or 6½ per cent., while one Company—their greatest opponents—only paid a dividend of 4¼ per cent., and the undertaking supplying St. Olave's paid 6 per cent.

Alderman HARBORD said that in seventeen years they had paid £17,300 off their capital account.

Mr. Stickland's proposition was defeated, and the accounts were passed.

At the last meeting of the West Ham Town Council, the Highways and Parks Committee reported having had under consideration the question of providing a suitable gas testing-station at Canning Town in accordance with section 17 of the Gaslight and Coke Company's Act, 1909. The Borough Engineer submitted, as a result of his inquiries, an offer from the Gaslight and Coke Company to rent to the Council their meter-house and valve-room at Canning Town for this purpose, and the offer is to be accepted.

WATER SUPPLIES PROTECTION BILL.

The Joint Committee of the House of Lords and the House of Commons, presided over by Lord MacDonnell, resumed consideration on June 28 of the above Bill (see *ante*, p. 54).

Mr. F. J. Bancroft, B.Sc., the Engineer and Manager to the Barnet District Gas and Water Company, and Consulting Water Engineer to the Bridlington Corporation, summarized the position of the Barnet Company, and stated that if the Bill passed works actually being executed by the Company would be arrested. They had acquired land without applying to Parliament for authority; and they considered that they had power to sink wells on it. The Bill, however, would stop them. It would also prevent them deepening or enlarging their existing wells. The word "specified" in clause 3 should be replaced by "authorized." The Barnet Company's land had been "authorized," but not definitely "specified." Clause 3 would rob the Company of powers which were given them by a Committee of Parliament, and which had been upheld on appeal to the House of Lords. If the Bill became the general law, it would be practically impossible to upset it by the insertion of provisions in a Private Act. It would be fair that land should be authorized and specified in future water enactments. Questioned as to whether at present if a water company bought land they could not drain all the water they could get, witness said that unless they had power to sink wells, the decision in the East Grinstead case—that general occupation of land did not give power to statutory companies to sink wells—would apply. It was impossible to specify works which might be necessary several hundred feet underground. It would be better to specify the quantity of water than the works. He objected to clause 3 having a retrospective effect and to the specification, under it, of works. Such specification would, in many cases, be impracticable. With regard to the suggestion of the Lord Chancellor, when the Barnet Company's case was before the House of Lords, that it was not desirable to give water companies the right to sink wells and drain water from the locality without careful examination of all the facts, the site, the works, and so forth, witness pointed out that the judgment was given in favour of the Company without their case being heard. If the Company had been able to present their case, they would have shown that Parliament had had the information; and this might have modified the Lord Chancellor's statement. He agreed, however, that water undertakers when applying to Parliament should "place all their cards on the board." Clause 3 would only prevent the sinking of wells by authorized undertakers. Very real danger was connected with the possibility of people, other than authorized undertakers, sinking wells close to undertakers' wells and taking their water.

Mr. Holt: Can you suggest any reason why there should be any greater restriction on the taking of water by wells for drinking purposes than for other purposes?

Mr. Bancroft: I think undertakers in many cases require protection from private supplies sunk for commercial purposes.

By Mr. J. H. Lewis: It would be desirable to have a survey of the water supplies of the country. He suggested the formation of a Water Commission on the same lines as the Railway Commission or the new Road Board. A general survey of the water supplies of the country would occupy some years; but if the Commission consisted of four—a geologist, a solicitor, one member to deal with overground water, and one to deal with underground water—they could begin operations at once. Local Boards to deal with watersheds would be extremely useful; but they would not obviate the necessity of a Water Commission, which would take a general survey of all the water supplies of the kingdom. At present, a scramble was taking place for watersheds. One of the things to be guarded against was the allocation of watersheds to districts without regard to other parts of the kingdom.

By the Chairman: The Commission would collect information and act as a Court of Appeal, as the Railway Commission did. The Bill should not proceed, because it would be unjust in some instances and unnecessary in others. In some respects, it was incomplete. Where a person was injured by the abstraction of water, he did not think he ought to be compensated. There should not be property in underground water. Parliament placed on local authorities or companies powers to do collectively what the individual could not do properly. Probably the water under an individual's land had fallen many miles away on another man's land. One man could not hold that his water should be collected by another man at a distance, or that his supply should always be at a particular level. An authorized undertaker supplied water better and cheaper than an individual did. If an undertaker was proved to have abstracted water from an outside area, he should be under obligation to supply water to that area.

The Chairman: That is a concession of the principle of compensation?

Mr. Bancroft: I should only supply at ordinary charges.

The Chairman: If it is impossible to compensate him in kind, would you go so far as to say money compensation should be given?—No; I do not think any property should be conceded in underground water.

By Lord Desborough: To give compensation in respect of underground water was to enter on a very dangerous principle. Parliament should deal with each case as it arose.

By Sir W. Crossley: He could not say it would be fair to give money compensation even where injury was admitted. If compensation was given, the obligation should rest not only on water undertakers, but on private owners of wells also.

By the Chairman: The burden of proof of injury should rest on the person seeking compensation. Where there were several undertakers in a district, it would be impossible in some cases to prove that one had not caused injury to a neighbouring well. With regard to supplying to local authorities on the route of a supply being brought from a distance, he did not think the principle as stated in the Bill was fair, because it gave the local authorities the option of a supply without payment towards the cost. The local authorities at the initiation of the scheme should state the quantity they wanted, and where and when they wanted it; and they should participate in the capital outlay. As to clause 6, the provision reserved all the obligations of a company or authority, whereas prior clauses took away some of the powers of the company or authority to fulfil their obligations. This was not fair. He would be disposed to exclude small companies and small local bodies working under the Public Health Act from the definition of "authorized undertaker." The Water Commission or Water Board might determine the point in each case.

Mr. Alfred J. Butler, the General Manager of the Staffordshire and Worcestershire Canal, gave evidence on behalf of the Canal Association, who represent about 2000 miles of inland waterways. The Association were in favour generally of the principle of clause 3, but held that the canals and inland navigation of England should have similar protection to that which was afforded any private owner of a water supply. The Staffordshire and Worcestershire Canal had suffered from the pumping of water-works, one of their reservoirs (the Pottal Reservoir) which had an available depth of 26 feet, and was about full until 1883, having been depleted by the pumping of the South Staffordshire Water-Works at Huntington until, in 1893, it was empty—a state in which it had remained ever since. The Canal Company did not sue for compensation in this case; the works of the Water Company being authorized. In order to safeguard the interest of canals, he suggested that the definition of "private water supply" in clause 7 should be amended so as to read as follows (the interpolated words being marked by italics):

> The expression "private water supply" includes rivers, springs, streams, *canals, reservoirs, feeders,* ditches, ponds, wells, and bore pipes, and the water flowing or percolating *in or* into *the same*, or, being therein, *or which, but for the works of an authorized undertaker, would flow or percolate in or into the same, or be therein* and owned or used by any person not being an authorized undertaker, *or which any such person is entitled to use.*

By Lord Desborough: Parliament had already practically admitted their claim to compensation.

Mr. Graham, speaking on behalf of the Sutton and District Water Company, expressed opposition to the Bill. If protection was to be afforded to underground water, it should extend to the undertakings of water companies—the most important water-getters in the country—inasmuch as the water they obtained was put to the best possible use to which it could be put. It seemed unjust the Bill should impose on them restrictions which did not apply to other water-getters. Clause 3 was unnecessary. As he understood it, it was not to be retrospective. The Lord Chairman's clause afforded ample protection. The greatest possible pains were taken to examine every proposal with regard to a water supply that was brought before Parliament. The Lord Chairman's clause was modified if special circumstances could be shown. The bearing of this was that every case should be considered on its merits. The law relating to underground water was unsatisfactory; but the proposal of the Bill was entirely one-sided. If it applied all round, he would not object to it. A good deal could be said for altering the law, because, no doubt, in some instances, considerable damage was done. Everyone concerned should be put on the same footing. A general inquiry, probably by Royal Commission, should be instituted with reference to the water supply question. One important result of the labours of such a Commission would be the discovery of what "bottom" there really was for complaints of injury. Very exaggerated statements were often made. Excluding the Metropolitan Water Board, there were twenty water authorities in Herts; but he had never heard it suggested that they could not get the water which they wanted. The object of the suggested Commission would be the conservation of the water supply. He approved of the creation of watershed conservancy boards. It was certainly not necessary, in a General Act, to shift the burden of proof. The clause with regard to the giving of water *in transitu* was quite unnecessary. People did not go to a distance for water unless the scheme was a big and ambitious one; and the closest attention therefore was given, when it was being considered, to everybody's rights. He would not exclude from the purview of the Bill small local bodies working under the Public Health Act. Everyone should be treated alike. It was extremely difficult to define "small authority." An authority might be small to-day and large next year; and it might abstract a small quantity this year and a large quantity next year.

Mr. James Johnston, Water Engineer to the Corporation of Brighton, gave evidence on behalf of the Corporation of Brighton, the Corporation of the City of Chichester, the Corporation of Worthing, the Steyning and District Water-Works Company, the Mid-Sussex Water Board, the Crowborough District Water-Works Company, the Hailsham Water Company, and the Newhaven and Seaford Water Company. These places were scattered over Sussex; they represented an area of over 300 square miles and a population of over 300,000. Representing Brighton, and at the request of the other authorities or companies named, he attended to object entirely to the Bill. Clause 3 would put all water authorities to unnecessary expense in the case of new works, however small the works might be. It would cause delay, which might be disastrous to the districts supplied and to the authorities supplying; and if it was retrospective in its operation, it would mean the forfeiture of very extensive rights acquired on terms dictated by landowners, all of which rights had been acquired at great cost by water authorities. At the present time, the Brighton Corporation had underground rights from the Earl of Chichester, extending for at least a mile-and-a-half under his property, for which they had paid either in kind or money. They had not yet exercised any of these rights. They had paid the Earl £6000 for 6 acres of land, which, as land, was not worth £1000; they had re-drained his house at a cost of £700; and they had spent money in laying mains to a village which was practically owned by him. They had not exercised a tenth of the rights thus acquired; yet if clause 3 were retrospective it would deprive them of the whole of these rights. If the clause were not retrospective, they would still be in a very awkward position, because, under clause 4, the landowners who had already been compensated would be able, if the Corporation damaged any of their ponds, ditches, or other property, to obtain compensation a second time. If clause 3 was not retrospective, it was unnecessary. If the Bill passed, the clause would become part of the general law; whereas, on good cause shown, if the Bill did not pass, the clause could be omitted or modified. If clause 3 became part of the general law, it would become most difficult for any water authority to get it modified. If clause 4 were made applicable "all round," it would hit not only water undertakers but colliery

proprietors, brewers, paper and mineral water manufacturers, railway companies, laundries, and dyers and cleaners. Before the law of the land as regarded underground water was altered, the question should be thoroughly threshed out. With reference to the proposed protected area, if the two-and-a-half-mile limit existed, the protected areas of different water undertakings would overlap in some cases by two or three miles; and there would be great expense and confusion in trying to ascertain which works caused particular damage. In regard to clause 5, no authorized undertaker should be called on to supply water *in transitu* unless his plans and estimates had been prepared originally on that understanding. Indeed, he failed to see how any responsible engineer could devise works of any magnitude unless protected in this way. Other things being equal, he was in favour of the general principle of distributing water *in transitu*. If, however, this principle were made the common law of the land, it might lead to the sources of some local authorities (those of rural district councils in particular) being depleted. These local authorities often had great difficulty now in obtaining a supply, in consequence of the expense. The water supply of the country would, in his opinion, eventually become a burning question. The water of the country was not properly conserved, and eventually we should find that resources had been wasted. Rural district councils might neglect sources near them in order to take water in transit from a large authority, and thus save expense. If he had to choose between specifying the works or the amount of water, he would prefer the latter. Under the Act of 1847, a supplying authority was under penalties to give a pure and wholesome supply, and was only exempt in the event of unusual drought or "the act of God." To limit the quantity to be taken from sources would be a very fine excuse for praying in aid the "act of God" in case of failure. He was not at all sure that legally a water authority could not avoid its obligations if Parliament limited them to a certain quantity of water, and particularly if they had to define their works. It was an impossibility for anybody to define beforehand works which would have to be constructed underground—at least in the South Downs area. The available sources of supply were being grabbed by water authorities irrespective of the future demands of other parts of the country. Such grabbing was not in the interests of the proper conservation of water. Hence there should be a Commission which would gather all the facts and report to Parliament with a view to the promotion of a Bill apportioning the country to Water Boards, who would advise Parliament and have a powerful influence when applications were made in respect of fresh water supplies.

The proceedings were resumed on June 30, when

Mr. J. F. BEAVAN, a member of the Cardiff Corporation, gave evidence. He thought it desirable that there should be an inquiry on the general question of the water supply throughout England. The water supply of Cardiff was mainly derived from storage in the Welsh hills, 30 miles distant; the cost of their three reservoirs having been nearly £1,300,000. It would be very unfortunate indeed if Cardiff were prevented from sinking a well in case of stern necessity. As far as he remembered, it had only arisen once in the case of Cardiff. That was during a prolonged drought. It would be a great hardship if they had to apply first to Parliament. If they wished to exercise their discretion outside their area, it might be fair that they should have to apply to Parliament. He did not see much necessity for clause 3. It appeared to him that everyone was fairly protected now, and that there was no necessity for altering the law. When applying to Parliament, there would, he thought, be no objection to defining the plant—stating the horse power, for instance. The provision as to giving supplies in transit was radically wrong. Cardiff had a reservoir 33 miles distant; and if they were bound to supply the intervening populations, they would have no water for themselves. They should not be compelled in any case to give a supply. It would be ruinous for a place like Cardiff to supply water to local authorities in transit. Small local authorities and companies should be allowed to provide schemes under the Public Health Act, as at present. If serious injury was done by pumping, compensation should be given; but when applying for permission to make a reservoir, the promoters should know what their liabilities would be. If compensation were payable, there would be the difficulty that people would be induced to make claims which would give a great deal of trouble. The onus of proof should rest, to the last degree, with the claimant. The proposed radius of 2½ miles was much too big.

Mr. C. H. PRIESTLEY, the Engineer to the Cardiff Corporation, stated that while the water supply of Cardiff was obtained by gravitation, they had power under their Acts to sink wells on land which they had purchased. The time had arrived when the Water-Works Clauses Acts needed revision. The general water supply of the country was not so well conserved as it might be. Many gathering grounds were not utilized to their fullest extent. It was desirable that there should be a general scheme which would benefit the whole community, and not merely portions of it. In order to secure better conservation, there should be an inquiry by Royal Commission into the whole question. He deprecated limitation of the discretion of water undertakers with regard to the use of pumping machinery. They did not know how a district would grow, and what pumping machinery would therefore be required. He was not prepared to say that it was fair that if pumping operations caused injury, the person injured should be compensated. Water was taken by water undertakers for the good of the community. At present, there was no property in subsoil water. If compensation were given, they would create property in such water. The question of supplying *en route* should be settled when the Bill sanctioning the scheme was before Parliament; so that the size of the works could be adapted to requirements.

Mr. JAMES WATSON, the Water Engineer to the Corporation of Bradford, stated that the supply of the city was obtained by gravitation. At Manywells, they had a well which was absolutely dried by a Mr. Pickles, the owner of a farm on the other side of the hedge, who sank a well and pumped the water to waste. Witness sank a deeper well; and the water was now running to Bradford again. If there was further pumping at a still lower level on the adjoining land, was he (witness) to be prevented by the Bill from exercising his common-law rights, as he did before, in order to regain the water?

The CHAIRMAN: This man, by sinking a well and taking away your water, committed a wrong against you?

Mr. WATSON: That is my view.

A wrong for which you think you ought to have been compensated?—Most certainly.

Then you are in favour of the principle of compensation?—I am in favour of the continuation of the common law of the land regarding underground water. I would like that man and a thousand others to be put in exactly the same position as water-works undertakers are going to be placed in if this Bill is passed.

That is to say, whoever causes damage to another should be liable to make the damage good, in money or otherwise?—Certainly. The Bradford Corporation had authority from Parliament to construct two more reservoirs; but, as he read clause 3, if this clause became law, they would have to give multifarious details to Parliament before proceeding with the construction of either. Clause 3, he considered, was an unnecessary restriction on their freedom of action.

Do you think that in supplying such a great city as Bradford with water you could when laying your plans foresee every possible development which circumstances might make necessary in the course of a few years?—No; you could not.

You therefore think it would be better to leave the Lord Chairman's clause as it is (that is, to be considered in reference to each individual case) than to put it into a General Act?—I do so most decidedly.

Mr. WATSON, in further examination, said he considered that the present arrangements for procuring water and making use of it for industrial purposes might be revised and improved. But what could such an authority as had been suggested do? They could get the rainfall of a drainage area and the approximate yield of the rain that fell. After they had this information, they had to face the *crux* of the question. Who could tell whether a certain drainage area, or its valleys, would be suitable for water-works purposes? No one. They would first of all have to make boreholes and pits in order to ascertain whether there was a water-tight foundation. He had known many cases in which they could not get a water-tight foundation at a particular place, and in which therefore they had had to go (say) half a mile up the valley, with the result that, while losing a large portion of the drainage area, they had to give the full amount of compensation water that was fixed. As to a small portion of a water supply, reasonably satisfactory information might be obtained if the suggested Commission took (say) the whole of the wells or pumps or works in a specified area and measured them for a long series of years. But nine-tenths of the people in this country were supplied by gravitation. How long would it take a Commission to ascertain anything beyond what were the drainage areas and the rainfall on them—facts that were easily ascertained nowadays? There was no necessity for the conservation of water supplies so far as water undertakers were concerned. It was not the water undertakers who were depleting the water supplies of the country. The Bill, however, would render much more difficult the work of undertakers—those who had to supply the great bulk of the population of this country. If a Committee or Commission took up the question of our water supplies, it would also need to take up the question of pollution.

Lord DESBOROUGH: You think you ought to have unlimited power to get as much water out of the land as you can, irrespective of the interest of anyone else?

Mr. WATSON: Not irrespective of the interest of anyone else. I want to have the same power as the owner of land. An owner can sink a well and sell the water to a public authority—it is done; and he is under no restriction. I am opposed to the provision that every local authority shall be allowed to demand a supply from water in transit.

Mr. C. G. HENZELL, the Water Engineer to the City of Leeds, stated that the water supply of the city was obtained entirely by gravitation. By a clause in their Act of 1901, they had power to lay an aqueduct, consisting of one or more conduits. One had been laid; and it struck him that, under clause 3 of the Bill, if it became law, they would have to make another application to Parliament before a second could be laid. The Lord Chairman's clause was inserted in the Leeds Act of 1907; and was not retrospective. If clause 3 of the Bill were enacted, it would have a retrospective effect. The question was how far it would prevent Leeds exercising the powers which they at present possessed. If clause 3 was intended to apply only to the future, he thought the matter to which it related might be threshed out when big undertakers applied to Parliament for powers. Asked as to whether he accepted the principle of compensation, he said that the question was a wide one. The Corporation always recognized the principle in any of the works they took in hand. The obligation should rest on the private owner as well as on the public undertaker. The person injured should be required to prove his case. It was equitable that local authorities should be supplied from water in transit; but he did not agree with the clause in the Bill. The matter should always be settled when undertakers were applying in the first instance to Parliament. He would not confer power on a Government Department to say whether, subsequently, a supply should be given. Such small local authorities and companies as at present supplied under the Public Health Act should not be required to apply to Parliament. In their case, the Local Government Board might be empowered to impose restrictions on them. The Bill was entirely one-sided. There were certain provisions in it, however, which he would be prepared to accept if they were applied to colliery owners, brewers, railway companies, and others drawing water. He did not see what good could come from such an inquiry as had been suggested.

Mr. STILEMAN, giving evidence on behalf of the Company supplying water to Eastbourne, stated that they obtained their supply entirely by pumping. Some years ago, owing to drought and to the sea being at a higher level than that in their well, salt water got into the supply. The late Duke of Devonshire (the then Chairman of the Company) allowed them to have land, and found the necessary money; and in the end a fresh supply was secured. If the present Bill had been law, this could not have been done, and the result would have been that the general public of Eastbourne, as well as the Company, would have suffered considerably. Probably two years would have been occupied in obtaining an Act of Parliament.

Abstracts of further evidence tendered to the Committee will be given in a subsequent issue of the "JOURNAL."

PAIGNTON WATER-WORKS.

The members of the Western and Southern Districts of the Institution of Municipal Engineers held a joint meeting at Paignton on Monday of last week, at which the following description of the water-works was given by Mr. J. C. HAWKINS, Assoc.M.Inst.C.E., the Water Engineer to the Urban District Council.

The old water-works, originally owned and carried on by a private Company, but afterwards purchased by the Urban District Council, are situated some two miles west of the centre of the town, and comprise two impounding reservoirs of a capacity of 11 million gallons, and four sand filter-beds, having a total area of 3200 square feet. The source of this supply is springs, issuing up from the bottom of one of the reservoirs. All surface water from the surrounding land is diverted from the reservoirs, as there are a few farms and dwelling-houses within the watershed.

In 1899, the Council promoted a Bill in Parliament, and in the following year obtained sanction to construct additional works on Dartmoor to augment the old supply. Several sites were carefully examined and considered; and eventually it was decided to impound the head waters of the Ventford Brook, a tributary of the Dart. The works proposed under the Act of 1900 were to divert the main road and a leat, build a dam, construct filter-beds and a service reservoir, lay a main, and purchase the watershed. The works were commenced in 1901 and completed in 1907—being divided up into several sections for contract purposes. Mr. F. W. Vanstone, of Paignton, was the Resident Engineer, and Mr. Baldwin Latham, M.Inst.C.E., the Consulting Engineer. The estimated cost was about £70,000; but, as seems to be usual on Dartmoor, the foundations were troublesome, and altogether a sum of about £111,000 was expended.

The watershed owned by the Council is some 700 acres in extent, and is, and always has been, free from human habitation since our early ancestors left their rude stone dwellings. The reservoir has a top water area of 34 acres, and a maximum depth at the dam of 54 feet. It contains 200 million gallons of water, and 400,000 gallons have to be given back to the brook by way of compensation. A fence has been erected round the reservoir, to prevent pollution by the animals which run wild on this section of Dartmoor. The height of the watershed above Ordnance datum varies from 880 to 1695 feet; and the average rainfall over the watershed is something like 68 inches per annum.

The dam is 618 feet long, and impounds a maximum depth of 54 feet of water. The greatest width at the base is 41 feet, and the deepest excavation for the trench was 75 feet below the surface of the ground. All building stone for the dam was quarried close to the site; and the dam is a first-class example of a masonry erection—there being no leaks whatever. Water may be drawn off at four different levels for town supply; and each draw-off is fitted with a screen, worked from the top, to prevent the admission of leaves, grasses, weeds, &c.

Five sand filters have been constructed below the dam; and there have been recently erected three Candy mechanical filters, designed to deal with 8000 gallons of water per hour each. The water, as delivered from the reservoir, has a slight action on lead, and is very soft. After many experiments with limestone of all shapes and sizes in the sand filters, it was considered advisable to erect the Candy filters and use "Magnesite" in them; this material being Mr. Candy's special medium for imparting hardness and neutralizing acidity. Up to the present, the plant has been very successful; and in a recent test of the filtered water, the Medical Officer of Health (Dr. Vickers) reported that the hardness had been increased from 1½° to 3°, and that the water was distinctly alkaline, and thus has now no action on lead. The sand filters accomplish this also; but the process is much slower, and the filtered water is not quite so decidedly hard and alkaline.

The meters employed to register the water are numerous, and of various types. At Holne-moor there are two 8-inch Kennedy meters on the trunk main, and one 6-inch Kennedy meter on the compensation main; and where bulk supplies are given to other districts, there are Venturi, Siemens, and Kent meters. The trunk main is a 9-inch cast-iron pipe, commencing at Holne-moor and terminating on the Paignton district boundary in the Beacon Hill service reservoir, at an elevation of 600 feet above Ordnance datum. It has a total length of just over 16 miles, with a fall of 266 feet. Hatch boxes are fixed at one-quarter of a mile apart, along the whole length of pipes, for the admission at some future period of a scraper. The water, being soft, has a corrosive action on the pipes; and in a few years it may be found that their capacity will be very considerably reduced. Then they are to be scraped, and for a time their efficiency will be restored.

Since the Act of 1900 was obtained, the Council have entered into agreements with Teignmouth, Brixham, and Ipplepen to give them supplies of water in bulk. They take between them about 300,000 gallons per day; but when these supplies attain their maxima, it will be necessary to duplicate or increase the size of the main. For this purpose the Paignton Council are considering the advisability of promoting a Bill in Parliament.

There are three reservoirs: The Beacon Hill, standing at an elevation of 612 feet, and having a capacity of 600,000 gallons; St. Mary's, at a height of 345 feet, and with a capacity of 300,000 gallons; and the Westerland (old works), 182 feet high, and having a holding capacity of 11 million gallons. The Beacon Hill reservoir is connected to each of the two lower reservoirs and to the Brixham service reservoir. Paignton is therefore divided up into three zones for supply purposes; and in case of fire in the town, a good substantial pressure could be obtained from the middle zone reservoir.

Messrs. Ashmore, Benson, Pease, and Co., Limited, are to supply sulphate plant of 2 tons capacity per day, also condensers and a change-valve, to the Weymouth Gas Company, to the design of Mr. Douglas Colson, the Engineer. They have likewise to supply a sulphate heater for plant making 2¼ tons per day to the Enfield Gas Company, to the design of Messrs. W. A. Valon and Son.

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NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Meeting of the North British Association of Gas Managers at Dunfermline on Thursday was not distinguished by anything outstanding in the way of contribution to technical literature. It partook more of the festive nature; and, as is usually experienced when a characteristic of this kind attaches to a meeting, there was a very full attendance. The Association received a hospitality which, with a memory now stretching over a long series of years, I do not remember to have seen at all approached. The Corporation of Dunfermline entertained not only the members, but their lady friends, to luncheon in the middle of the day—an event which may be taken as indicative of the goodwill which the Corporation have, not to the gas industry, but to their own Gas Engineer, Mr. A. Waddell. When meeting was over—the proceedings having been brought to a close at an early hour to suit the arrangement—a species of extended garden party was given by the Dunfermline Carnegie Trust in Pittencrieff Glen. The glen is an exceedingly pretty spot, romantic in itself, and overlooked by the ancient towers of the now ruined palace and abbey. Here an hour was spent very pleasantly, despite the afternoon being wet. The weather improved the next day, when the annual excursion was held. Of the meeting itself, it is difficult to find anything to write which is not apparent on the surface of the proceedings. The address of the President was a modest production for Mr. Waddell. He gave a more interesting contribution to the meeting at Stirling last year, when he described his new high-pressure automatic three-way valve. It is not intended to decry the address of Thursday, which was couched in thoughtful vein, and was full of suggestion, such as might have been expected. The paper by Mr. J. W. Napier, of Alloa, on "Gaseous Fuel" introduced a subject which is of first importance at the present day; and it received a fitting amount of attention. Mr. Dickson, of Forfar, discoursed upon the checking of waste in small gas-works, and evoked a discussion such as is frequently experienced when the subject under consideration is not what may be termed a thrilling one—the speaking is readier and the suggestions more practical than when, to use the phrase introduced by Mr. Napier, the ferry is across deeper water. It will be observed that, in accordance with the recommendation of the Council, as it is now designated, the date of the annual meeting is to be changed from the end of July to some time in September—the middle of the month being spoken of. The step is a doubtful one, as by then many members will, for family reasons, have taken their holidays, and will neither have the time left to devote to more idle days, nor be caring to expend more money upon travel. The step is, however, only experimental. It was somewhat of a surprise that so little was said upon the subject of the William Young Memorial. Except the President's references to Mr. Young, there was not much about him on the lips of any of the speakers. This was to be regretted, as, with the step in view on the point of complete and happy fruition, it would have been natural, and commendable, that more voice should have been given to the debt which the gas industry owes to the great man whose memory the lectureship is intended to keep alive. The meeting, it is true, voted a hundred guineas from the Research Fund to the Memorial Fund. This is a mark of appreciation not to be overlooked; but it would have come more graciously from the Association had it been gifted with more manifestation of esteem.

As will be seen from a report in another column, the Edinburgh and Leith Gas Commissioners have disposed of the question of who was to succeed Mr. W. R. Herring as their Engineer without agitating the world of gas officials. That the Commissioners were resolved by all means in their power to retain the services of Mr. Herring is shown by the fact that, failing their getting his consent to remain in Edinburgh, they have pressed him, and obtained his consent, to continue to give them his advice in the capacity of Consulting Engineer. The terms of the agreement make it clear that the supervision which is intended is not to be of a superficial nature, but is to be continuous and thorough. With his knowledge of the works, and of the whole of the outdoor plant of the undertaking, and with efficient management on the spot, the fortunes of the Commissioners are as secure as they could well be. From the Commissioners' point of view, nothing but felicity can be entertained regarding the change which is now being effected, because, humanly speaking, no risks are being run. The gentleman to whom the care of the works is being entrusted—Mr. A. Masterton—is as familiar with the gas undertaking as anyone in the service of the Commissioners or out of it. He has been so long in office that he is acquainted with the historical side of the undertaking; and, his work having all along been on the engineering side, his knowledge in this direction is as complete as it is possible to be. He has been a most capable assistant—first to Mr. R. Mitchell, and afterwards to Mr. Herring. That he has served with satisfaction under two gentlemen of so widely different mental capacities, is a tribute to Mr. Masterton's talents than which no better need be asked for. By the method they have adopted in settling a subject which, the last time there was a vacancy—when Mr. Herring was appointed—was a somewhat thorny one, the Commissioners have saved themselves, as well as many applicants, much needless trouble; and in the assurance that they have done the best they could for the cause whose interests they have in their hands, outsiders can only acquiesce, and express their wish that the new arrangement may, as there is every reason to expect that it will, bring as much prosperity to the Commissioners as that which is now coming to an end. The Commissioners are this autumn making a more than an ordinarily sweeping change in the *personnel* of their officials. Not only is the Engineer going; but, before his resignation came, as a bolt from the blue, it had been arranged that both Mr. J. S. Gibb, the Treasurer, and Mr. R. Cockburn, the Collector, should retire, under the age-limit fixed by the last statutory powers obtained by the Commissioners. At the close of the proceedings on Thursday, the Commissioners entertained the two gentlemen, and presented them with copies of an appreciative minute which they had just adopted in public meeting. The proceedings revealed a length

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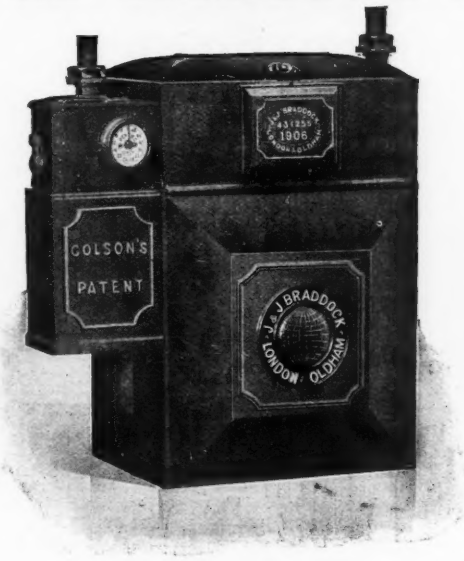

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of service on the part of the two gentlemen which, doubtless, few outside the Gas Commissioners' office realized. They have both seen long service; and both have been meritorious servants. Now that they are going into retirement, it will be a general wish, among all who had the privilege of their acquaintanceship, that both will enjoy their well-earned retiring allowances for a very long period.

At a meeting of the Edinburgh and District Water Trust on Wednesday, Mr. John Murray, the Convener of the Finance Committee, in presenting the annual accounts, said the estimated income for the past year amounted to £174,110, against an actual income of £172,874. This was fully £1200 under the estimate. The decrease was chiefly accounted for under the heading of domestic water-rate, and was owing in great measure to unlet property. The expenditure under the heading of revenue account for the year amounted to £153,042; while the estimated expenditure was £161,048. From this it would be seen that the expenditure was considerably over-estimated. This was mainly accounted for under the heading of repairs, interest, expense of loans, and distribution-pipe renewals, but chiefly under the latter heading. The capital expenditure for the year amounted to £26,064, of which the Fairmilehead mechanical filters were responsible for £7778, and distribution-pipes for £16,199—chiefly in connection with the Craigmillar pipe and other extensions throughout the city. During the year, the contribution to the sinking fund was £20,122; and capital expenditure amounting to £377,828 had now been paid off. The total capital expenditure of the Trust up to Whitsunday last amounted to £2,818,870. Mr. Murray moved that the Trustees adopt the estimates as recommended by the Finance Committee, and that the rates should be as at present. The motion was agreed to unanimously.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *July* 29.

Sulphate of Ammonia.

The better tone reported last week has been maintained, and production has been readily absorbed at full prices, while in some instances an advance has been scored. The closing quotations are £11 15s. to £11 16s. 3d. per ton f.o.b. Hull, £11 17s. 6d. to £11 18s. 9d. f.o.b. Liverpool, and £12 f.o.b. Leith. For future delivery, further transactions are reported to have taken place at £12 per ton f.o.b. Leith for equal monthly quantities up to the end of this year and over the first half of 1911, and makers are now asking more money in the latter position.

Nitrate of Soda.

In consequence of a substantial increase in the price of this article at ports of shipment, holders in Liverpool have also raised their quotations, which are now 9s. 3d. per cwt. for ordinary quality and 9s. 6d. for refined quality, on spot.

LONDON, *July* 29.

Tar Products.

Business in tar products still continues quiet. Pitch remains about the same. Fresh inquiries are scarce. Creosote is steady. There is a little more demand for this article; but the price does not improve. Benzols and naphtha remain in about the same position, although reports from some quarters state that an improvement in price has been paid. Crude carbolic acid consumers do not improve in their bids; and, on the other hand, makers will not come down in their ideas of price.

The average values during the week were: **Tar**, 15s. 9d. to 19s. 9d., *ex* works. **Pitch**, London, 33s. to 34s.; east coast, 32s. 6d. to 33s.; west coast, 31s. 6d. to 32s. 6d. f.a.s. Mersey ports. **Benzol**, 90 per cent., casks included, London, 6⅞d. to 7¼d.; North, 6d. to 6½d.; 50-90 per cent., casks included, London, 7⅜d.; North, 7d. to 7¼d. **Toluol**, casks included, London, 10d.; North, 9d. to 9½d. **Crude naphtha**, in bulk, London, 3½d. to 3¾d.; North, 3¼d. to 3½d.; solvent naphtha, casks included, London, 1s. 2d. to 1s. 3d.; North, 1s. 2d. to 1s. 3d.; heavy naphtha, casks included, London, 11d. to 1s.; North, 10d. to 11d. **Creosote**, in bulk, London, 2½d. to 2⅝d.; North, 2d. to 2¼d. **Heavy oils**, in bulk, 2⅝d. to 2⅞d. **Carbolic acid**, 60 per cent., casks included, west coast, 1s.; east coast, 1s. 0½d. **Naphthalene**, £4 10s. to £8 10s.; salts, 40s. to 42s. 6d., bags included. **Anthracene**, "A" quality, 1½d. per unit, packages included and delivered.

Sulphate of Ammonia.

There has been a fair amount of business during the last few days, and prices on the whole have improved to the extent of 1s. 3d. to 2s. 6d. per ton. To-day actual Beckton is quoted at £11 12s. 6d. Outside London makes are £11 6s. 3d. to £11 7s. 6d., Hull £11 16s. 3d. to £11 17s. 6d., Liverpool £11 17s. 6d. At Leith, makers report that they are sold for prompt, and are asking £12 2s. 6d. to £12 5s. for forward. Middlesbrough is quoted at £11 17s. 6d. to £12.

Preston's Saving by Waste-Water Meters.—At their meeting on Thursday last, the Preston Town Council decided to fix twenty waste-water meters in different parts of the borough, with the object of preventing wastage. It was explained that a number of these meters had already been fixed; and in those districts 2,262,000 gallons a day were formerly consumed, compared with 1,612,000 gallons now—a saving of 650,000 gallons per day.

Gas-Meter Testing in Bristol.—The Inspector of Gas-Meters for Bristol examined and tested 444 meters last quarter. The number incorrect within the provisions of Sale of Gas Act, 1859, was 353; and 321 of these, or 90·94 per cent., registered in favour of the consumer. The percentage of error in incorrect meters in favour of the seller averaged 3·50, with a maximum of 9·65. In favour of the consumer the average was 9·56 per cent., with a maximum of 44·90 per cent.

THE "DARWEN" ARCH PIPE

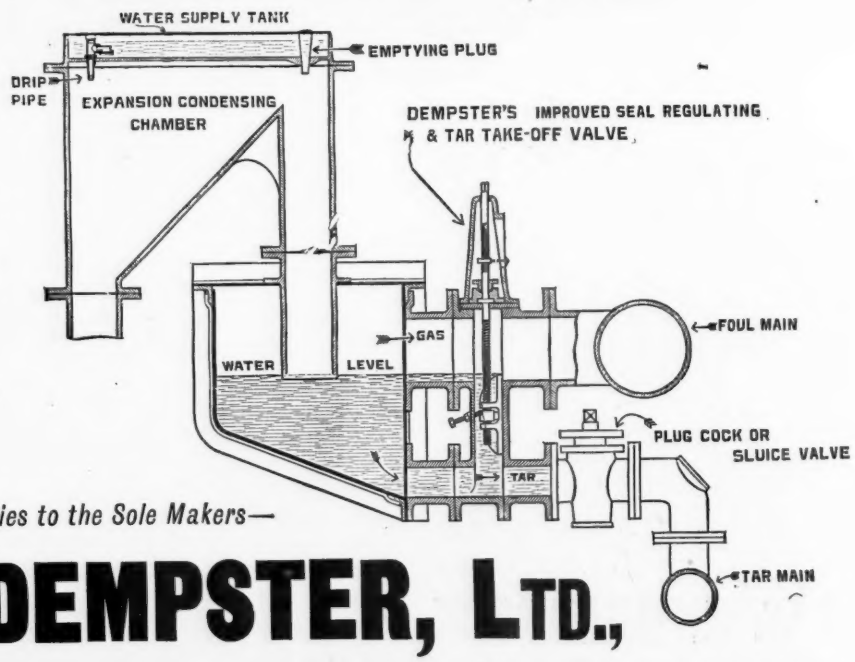
Prevents Stopped Ascension Pipes.

"The Cost is moderate and can be saved in a Single Season."

"The Arch Pipes can be seen in operation upon application."

"It will pay you to try them upon troublesome Pipes."

Upwards of 400 are already at Work or on Order.



Please address all Enquiries to the Sole Makers—

R. & J. DEMPSTER, LTD.,

GAS PLANT WORKS, **MANCHESTER.**

COAL TRADE REPORTS.

Northern Coal Trade.

There has been a better demand for coal in the last few days, owing to the making up of arrears after the strike. But the supply is now full; and there are heavy shipments. In steam coals, the price of best Northumbrians is from about 10s. per ton f.o.b., second-class steams are from 9s. to 9s. 3d., and steam smalls are rather more plentiful at from 5s. 6d. to 6s. 9d. The collieries are now working steadily, with a good output. Gas coals are rather more active; and the price of the usual qualities of Durham descriptions varies from 9s. per ton f.o.b., according to quality. For "Wear specials," up to 10s. 6d. per ton f.o.b. is still quoted. There have been more sales to some of the Mediterranean ports; and the price varies from 15s. to 16s. 1d. per ton, according to quality and tonnage, delivered at Genoa. Sales have also been made to Sweden at prices varying from 9s. 1½d. per ton f.o.b. for second-class gas coals. Other sales are in course of negotiation; so that there seems to be more desire to contract forward. In the coke trade the demand is good. Gas coke is quoted from 15s. 6d. to 16s. 3d. per ton f.o.b., according to quality, in the Tyne or Wear.

Holophane Limited.—A Company has been registered under this title, with a capital of £200,000, in £1 shares (100,000 being 7 per cent. preference shares), to acquire from O. A. Mygatt, of Paris, all his interests in the Holophane system of illumination in all parts of the world except France and the French colonies. The first Directors (to number not less than three nor more than seven) are: O. A. Mygatt (President of the Holophane Glass Company of New Jersey), Lieut.-Col. F. J. P. Butler, G. C. Glyn, D.S.O. (Manager of the Holophane Company of London), Lord Ernest William Hamilton (Chairman of the Le Roi No. 2, Limited), and Mr. R. Woodhouse, jun. The registered offices are at No. 12, Carteret Street, S.W.

Abstraction of Water from the Thames.—At a recent meeting of the Conservators of the River Thames, the Special Committee on Thames Water Abstraction reported that they had prepared and submitted to the Hon. T. W. H. Pelham (Assistant-Secretary to the Board of Trade) and Mr. F. J. Willis (Assistant-Secretary to the Local Government Board) a statement of the case of the Conservators for an expression of opinion by these gentlemen as to what they would consider a fair settlement of the questions at issue between the Conservancy and the Metropolitan Water Board with reference to the abstraction of water from the Thames. The report was adopted; and it was announced that a letter had been received from the Metropolitan Water Board, enclosing a copy of a resolution passed by the Board on the subject. It was to the effect that the Board should join with the Thames Conservancy in asking Mr. Pelham and Mr. Willis to give their opinion as to what would be a fair settlement of the questions at issue. The motion further authorized the Works and Stores Committee of the Board to settle their case to be submitted.

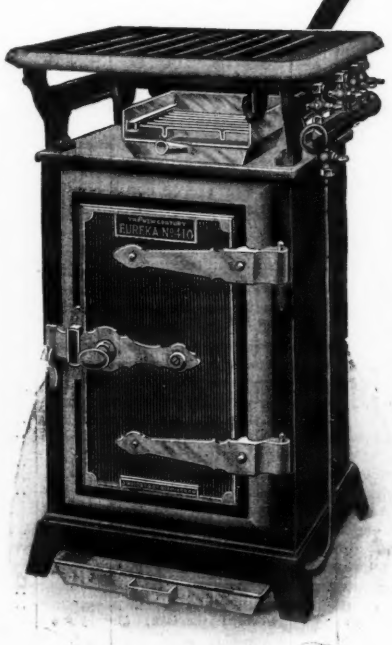
Gas Examinerships of the London County Council.—At the meeting of the London County Council last Tuesday, the recommendations of the Public Control Committee on this subject, given in the "JOURNAL" for the 26th ult. (p. 279), were adopted without discussion.

Bristol Public Lighting by Gas.—Of 10,007 public lamps in Bristol, 9171 are gas; and the consumption of gas for street lighting during the past financial year was 141,881,787 cubic feet. In the past six years, the number of gas-lamps has steadily risen from 8150; while in the same period the gas consumed has decreased by upwards of 30 million cubic feet.

Melbourne Metropolitan Gas Company.—The London Agents for this Company (Messrs. John Terry and Co.) have received a cable advice to the effect that the profits for the half year ended the 30th of June last were £82,000. A dividend of 5s. per share has been declared for this period, a sum of £39,000 added to the reserve fund, and a balance of £2305 carried forward.

Coalite's Foreign Contracts.—The following appeared under the heading "Chat on 'Change" in the "Daily Mail" last Wednesday. "There has been considerable wonder among those interested in Coalite Limited, the parent Company, as to what is taking place with regard to the various foreign contracts, as to which we heard so much some time ago. The following statement by the Secretary of the Company, in a letter to a correspondent, throws some light on the matter. 'With regard,' the Secretary writes, 'to the St. Petersburg negotiations, I have to say that these are still in abeyance, as the St. Petersburg Municipality has not yet made a further call for fresh tenders. I would also state that the negotiations with Continental groups have not fallen through, and that there is an arrangement concluded with the colliery in the South of France that may be put into operation at any time.'"

Profits and the Rates.—At an inquiry relative to the borrowing of further money for the Aston electricity undertaking, Mr. H. R. Hooper, the Local Government Board Inspector, while admitting that the profits last year were eminently satisfactory, asked whether anyone could show him where the advantage came in of transferring to the reduction of the rates £1500 with one hand, and borrowing £1500 with the other for an expenditure like services, which was continually going on. It was no advantage to the ratepayers, and no advantage to the undertaking. To borrow money with one hand at 3¾ per cent., and to pay it out as a bonus with the other, meant that the ratepayers had to pay the 3¾ per cent. Mr. Godrich (the Chairman of the Electricity Committee) pointed out that they had acted in the interests of the ratepayers; the rates having been reduced in consequence of the contributions from the electricity undertaking. Mr. Hooper retorted that the poor would not benefit from it, because they paid their rent and rates at so much a week. It was only the well-to-do people who got the benefit of the reduction, at a cost to the general undertaking. Why, he repeated, should they borrow £1500 to last them the next two or three years and pay 3¾ per cent. for it, when they had the money in their own coffers?



The "EUREKA"

The Pioneer Gas Cooker!

Offer a Consumer the choice between the "Eureka" and any other Gas Cooker, and it is a foregone conclusion that she will choose,

THE "EUREKA"!

SHE KNOWS that Cookery Comfort in its ideal form is embodied in the "EUREKA."

SHE KNOWS that for hard and continuous wear the cooker that stands alone is the "EUREKA."

SHE KNOWS that those nice refinements of finish which appeal so strongly to a woman are among the chief and original features of the "EUREKA."

The Standard Cooker!

The Standardised Cooker!!

JOHN WRIGHT & CO.,
Essex Works,
BIRMINGHAM.

240.

APPLICATIONS FOR LETTERS PATENT.

17,030.—Meyer, E. G., "Gas-burners of the automatic lighting and governing type." July 18.
17,043.—Lewis, G. P., and True, C. L., "Gas manufacture." July 18.
17,048.—Jones, W., "Gas-producers." July 18.
17,097.—Beal, S., and Edward Deane and Beal, Limited, "Fitting for detachably supporting gas-pendants for show-room purposes." July 18.
17,167.—Drumgold, C. T., "Cocks for fluids." July 19.
17,173.—Glover, T., "Gas-meters." July 19.
17,277.—Engel, H. W. W., "Lighting plants and apparatus." July 20.
17,281.—Masters, J. R., "Gas purifying apparatus." July 20.
17,333.—Carter, W. G. & G. A., "Valveless gas-turbine." July 21.
17,359 —Burkheiser, K., "Producing sulphate of ammonia in the manufacture of gas." July 21.
17,416.—Williams, J., "Pressure-raisers." July 22.
17,428.—Still, W. M., and Sons, Ltd., and Still, E. H., "Incandescent burners." July 22.
17,442.—Holmes, E. L., "Gas-governor." July 22.
17,470.—Bowley, J. W., "Measuring the flow of liquids." July 22.
17,516-7.—M'Loughlin, F., "Water-heaters." July 23.
17,518.—M'Loughlin, F., "Combination plug-tap." July 23.
17,548.—Otto-Hilgenstock Coke-Oven Company, Ltd., "Separating tar from gases." July 23. A communication from Dr. C. Otto and Co., G. m. b. H.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

Gas Manager. Silsden Urban District Council. Applications by Aug. 5.
Outside Superintendent. Stockport Gas Department. Applications by Aug. 10.
Draughtsmen. Newton, Chambers, and Co., Thorncliffe Iron Works.
Draughtsmen. No. 5168.
Representative. "Gas-Works," c/o Streets, Cornhill.

Situation Wanted.

In Gas or Water Concern. No. 5265.

Plant (Second-Hand) for Disposal.

Purifiers, &c. Malvern Urban District Council.

Meetings.

Brentford Gas Company. St. Ermin's Hotel, Aug. 5, 2.30 o'clock.
Bromley and Crays Gas Company. Gas-Works, Aug. 4, Six o'clock.
Irish Association of Gas Managers. City Hall, Belfast, Aug. 9.
Southgate Gas Company. London Offices, Aug. 18, 3.45 o'clock.

Patent Licences, &c.

Improvements Relating to Acetylene Lamps and Generators, &c. Haseltine, Lake, and Co., Southampton Buildings, W.C.

TENDERS FOR

Coal and Cannel.

Bradford Gas Department. Tenders by Aug. 25.
Haverfordwest Corporation. Tenders by Aug. 13.
Hebden Bridge and Mytholmroyd Gas Board. Tenders by Aug. 8.
New Mills Urban District Council. Tenders by Aug. 16.

Oxide of Iron (New and Spent).

Rochdale Gas Department, Tenders by Aug. 17.

Pipes, &c.

Heywood Gas Department. Tenders by Aug. 8.

Retort-House Governor.

Devonport Gas Department Tenders by Aug. 6.

Sewage Disposal Works—Engines, Pumps, Valves, Pipes, Weir Plates, &c.

Yeovil Corporation. Tenders by Aug. 23.

Sulphate Plant.

Accrington Gas and Water Board.

Sulphuric Acid.

Heywood Gas Department. Tenders by Aug. 8.

Tinned Goods.

Heywood Gas Department. Tenders by Aug. 8.

Valves and Ironwork for Purifiers.

Bangor (Co. Down) Urban District Council. Tenders by Aug. 16.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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All Communications, Remittances, &c., to be addressed to Walter King, 11, Bolt Court, Fleet Street, London, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 315.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,474,000	Stk.	Apl. 1	5	Alliance & Dublin Ord.	81–83	..	6 0 6
310,000	Stk.	July 14	4	Do. 4 p.c. Deb.	97–99	..	4 0 10
200,000	5	May 12	7	Bombay, Ltd.	6⅜–6⅝	..	5 9 10
40,000	5	,,	7	Do. New, £4 paid	4⅜–5⅛	..	5 9 3
50,000	10	Feb. 25	15	Bourne-mouth Gas and Water	10 p.c.	..	5 0 0
					B 7 p.c.	..	4 3 7
311,810	10	,,	7		Pref. 6 p.c.	..	3 17 5
75,000	10	,,	6		20–30	..	5 0 0
380,000	Stk.	,,	12½		15–15⅜	..	3 17 5
330,000	,,	..	9⅜	Brentford Consolidated	252–255	..	4 18 1
50,000	,,	Aug. 12	5	Do. New	188–190	..	5 0 0
206,250	,,	June 10	4	Do. 5 p.c. Pref.	120–122	..	4 2 0
220,000	Stk.	Mar. 16	11	Do. 4 p.c. Deb.	99–101	..	3 19 3
246,320	,,	,,	8	Brighton & Hove Orig.	214–217	..	5 1 5
460,000	20	Apl. 1	10⅝	Do. A Ord. Stk.	153–156	..	5 2 7
109,000	Stk.	Feb. 25	6	British	44–45	..	4 14 8
165,700	,,	,,	4½	Bromley, A 5 p.c.	119–121	..	4 19 2
82,278	,,	,,	5⅛	Do. B 3½ p.c.	89–91	..	4 18 11
55,000	,,	June 29	3½	Do. C 5 p.c.	105–108	..	5 1 10
250,000	Stk.	June 29	4	Do. 3½ p.c. Deb.	85–87	..	4 0 6
100,000	10	—	—	Buenos Ayres 4 p.c. Deb.	7–99	..	4 0 10
100,000	10	—	—	Cape Town & Dis., Ltd.	3–4	..	—
50,000	50	May 3	6	Do. 4½ p.c. Pref.	5⅛–6⅛	..	—
100,000	Stk.	June 29	4½	Do. 6 p.c. 1st Mort.	49–50	..	6 0 0
157,150	Stk.	Feb. 25	5	Do. 4½ p.c. Deb. Stk.	88–90	..	5 0 0
1,513,280	Stk.	Feb. 25	5 5/10	Chester 5 p.c. Ord.	109–111	..	4 10 1
560,000	,,	,,	5	Commercial 4 p.c. Stk.	108–110	..	4 11 7
475,000	,,	June 29	3	Do. 3½ p.c. do.	103–105	..	4 15 3
800 000	Stk.	June 10	5	Do. 3 p.c. Deb. Stk.	80–82	..	3 13 2
200,000	,,	,,	7	Continental Union, Ltd.	89–91	−2½	5 9 11
492,240	Stk.	—	5⅛	Do. 7 p.c. Pref.	135–137	..	5 2 2
55,000	,,	—	4	Derby Con. Stk.	121–123	..	4 9 5
148,995	,,	Apl. 1	5	Do. Deb. Stk.	104–105	..	3 16 2
486,092	10	July 14	12	East Hull 5 p.c. Ord.	96–98	..	5 2 0
351,060	10	,,	12	European, Ltd.	23⅝–24¼*	..	4 18 0
16,198,672	Stk.	Feb. 10	4⅜	Do. £7 10s. paid.	17½–18¼*	..	4 18 8
2,600,000	,,	,,	3⅜	Gas light and Coke	4 p.c. Ord.	..	4 7 7
4,002,235	,,	,,	4		3½ p.c. max.	..	3 16 11
4,531,706	,,	June 29	3		4 p.c. Con. Pref.	..	3 15 6
258,740	Stk.	Mar. 16	5		3 p.c. Con. Deb.	..	3 13 2
82,500	,,	,,	6⅜	Hastings & St. L. 3½ p.c.		..	5 5 3
70,000	10	Apl. 29	11	Do. do. 5 p.c.		..	5 9 3
131,000	Stk.	Mar. 16	7	Hongkong & China, Ltd.		..	6 5 9
65,780	,,	,,	5⅜	Ilford A and C		..	4 15 3
65,500	,,	June 29	4	Do. B		..	4 19 1
				Do. 4 p.c. Deb.		..	4 0 0
4,940,000	Stk.	May 12	8	Imperial Continental	179–181	..	4 8 5
1,235,000	Stk.	Feb 10	3⅜	Do. 3½ p.c. Deb. Red.	94–96	..	3 12 11
195,242	Stk.	Mar 16	6	Lea Bridge Ord. 5 p.c.	122–124	..	4 16 9
561,000	Stk.	Feb. 25	10	Liverpool United A.	219–221	..	4 10 6
718,100	,,	,,	7	Do. B	164⅜–165⅜	..	4 4 7
306,083	,,	June 29	4	Do. Deb. Stk.	104–106	..	3 15 6
75,000	5	June 29	6	Malta & Mediterranean.	4⅞–4⅞	..	6 4 8
560,000	100	Apl. 1	5	Met. of 5 p.c. Deb.	100–102	..	4 18 0
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	100–102	..	4 8 3
541,920	20	May 27	3½	Monte Video, Ltd.	12⅜–13	..	5 7 8
1,775,892	Stk.	Feb. 25	4⅜	Newc'tle & G'tesh'd Con	103⅜–104⅜	..	4 3 9
529,435	Stk.	June 29	3⅜	Do. 3⅜ p.c. Deb.	89–91	..	3 16 11
55,940	10	Feb. 25	7	North Middlesex 7 p.c.	13⅜–13⅝	..	5 1 10
300,000	Stk.	Apl. 29	8	Oriental, Ltd.	138–140	..	5 14 4
60,000	5	Apl. 1	8	Ottoman, Ltd.	6⅛–6⅜	..	6 3 1
31,800	53	Feb. 25	13	Portsea Island A.	134–136	..	5 1 0
60,000	50	,,	13	Do. B.	126–128	..	5 1 7
100,000	50	,,	12	Do. C.	119–121	..	4 19 2
114,800	50	,,	10	Do. D and E.	100–102	..	4 18 0
398,490	5	Apl. 29	7	Primitiva Ord.	7⅛–7⅜	..	4 13 4
796,980	5	June 29	5	Do. 5 p.c. Pref.	5⅛–5⅜	..	4 10 11
488,900	100	June 1	4	Do. 4 p.c. Deb.	97–99	..	4 0 10
312,650	Stk.	June 29	4	River Plate 4 p.c. Deb.	97–99	..	4 0 10
250,000	10	Apl. 1	9	San Paulo, Ltd.	15⅝–16⅛	..	5 10 9
62,500	10	,,	6	Do. 6 p.c. Pref.	11⅝–12⅛	..	4 18 0
125,000	50	July 1	5	Do. 5 p.c. Deb.	49–50	..	5 0 0
135,000	Stk.	Mch. 16	10	Sheffield A	234–236	..	4 4 9
209,984	,,	,,	10	Do. B	234–236	..	4 4 9
523,500	,,	,,	10	Do. C	233–235	..	4 5
70,000	10	May 27	7	South African	11–11⅛	..	6 1 9
6,429,895	Stk.	Feb. 10	5/9/4	South Met., 4 p.c. Ord.	121–123	..	4 8 10
1,895,445	,,	July 14	3	Do. 3 p.c. Deb.	79–81*	..	3 14 1
209,820	Stk.	Mar. 16	8	South Shields Con. Stk.	157–158	..	5 1 3
605,000	Stk.	Feb. 25	5⅜	S'th Suburb'n Ord. 5 p.c.	121–123	..	4 12 0
60,000	,,	,,	5	Do. 5 p.c. Pref.	121–123	..	4 1 4
117,058	,,	July 14	5	Do. 5 p.c. Deb. Stk.	120–122*	..	4 2 0
502,310	Stk.	May 12	5	Southampton Ord.	110–112	..	4 9 3
120,000	Stk.	Feb. 10	5††	Tottenham A 5 p.c. and B 3½ p.c.	139–141	+6	4 19 3
453,940	,,	,,	5⅜†		114–116	+1	4 14 10
149,470	,,	June 29	4	Edmonton 4 p.c. Deb.	57–59	..	4 0 10
182,380	10	June 10	8	Tuscan, Ltd.	9–9⅜	..	8 8 6
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	97–99	..	5 1 0
236,476	Stk.	Feb. 25	5	Tynemouth, 5 p.c. max.	113–115	..	4 6 11
255,636	Stk.	Feb. 25	6⅞†	Wands-worth B 3½ p.c.		..	4 15 9
79,416	,,	June 29	3	3 p.c. Deb. Stk.	73–75	..	4 0 0

Prices marked * are "Ex div." † Next dividend will be at this rate.

OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 183, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

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HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no back Pressure.
The Cheapest in the Market.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

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HUDDERSFIELD,
Are prepared to Supply
BENZOL, TOLUOLE, NAPHTHA, AND CREOSOTE
in large Quantities.
ENQUIRIES SOLICITED.

"HALLITE" Asbestos High-Pressure Sheeting.
HALLITE DOUGLAS, LIMITED, 106, Leadenhall Street, LONDON, E.C.

SULPHURIC ACID for Sale, specially suitable for making Sulphate of Ammonia.
BROTHERTON AND CO., LTD., Chemical Manufacturers, Works: BIRMINGHAM, LEEDS, SUNDERLAND, and WAKEFIELD.

"GAZINE" (Registered in England and Abroad). A radical Solvent and Preventative of Naphthalene Deposits, and for the Automatic Cleaning of Mains and Services.
It is also used for the enrichment of Gas.
Manufactured and supplied by C. BOURNE, West Moor Chemical Works, KILLINGWORTH, or through his Agent, F. J. NICOL, Pilgrim House, NEWCASTLE-ON-TYNE.
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PATENTS AND TRADE MARKS
PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 & 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 248 Holborn.

AMMONIACAL Liquor wanted.
CHANCE AND HUNT, LTD., Chemical Manufacturers, OLDBURY, WORCS.
Telegrams: "CHEMICALS."

GAS OILS.
MEADE-KING, ROBINSON, & CO.
Represent the Strongest Independent Refineries in America; also Petroleum Spirit for Gas Enrichment. 18, EXCHANGE STREET, MANCHESTER, and 11, OLD HALL STREET, LIVERPOOL.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 Years. References given to Gas Companies.

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams: SATURATORS, BOLTON. Telephone 0848.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 54 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams:—
"BRADDOCK, OLDHAM," and "METRIQUE, LONDON."

OXIDE OF IRON (BOG ORE).
ANY QUANTITY. ANY PORT. ANY STATION.
DONALD M'INTOSH,
110, CANNON STREET, LONDON.

DUTCH OXIDE OF IRON.
SPENT OXIDE PURCHASED IN ANY DISTRICT.

THE First Dutch Bogore Co., Ltd.,
NYMEGEN, HOLLAND.
General Manager (for England and Wales)—
CHARLES E. FRY, LEAMINGTON,
General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

AMMONIACAL Liquor wanted.
BROTHERTON AND CO., LTD., Ammonia Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, SUNDERLAND, AND WAKEFIELD.

J. E. C. LORD, Ship Canal Tar Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

D. ANDERSON AND COMPANY,
GAS LIGHTING ENGINEERS AND CONTRACTORS,
18 & 20, FARRINGDON ROAD, LONDON, E.C.
Telegrams: "DACOLIGHT LONDON." Telephone: 2336 HOLBORN.

W. EDGAR,
GAS APPARATUS MANUFACTURER.
BLENHEIM WORKS, HAMMERSMITH, LONDON, W.
Telegrams: "GASOSO LONDON." Telephone: 14 HAMMERSMITH.

TAR WANTED.
Telephone: Central Manchester, 7002.
Telegrams: "UPRIGHT."
Apply, THOMAS HORROCKS,
Albert Chemical Works, BRADFORD, MANCHESTER.
Pitch, Creosote, Brick and Fuel Oils, Benzol, Solvent Naphtha, Carbolic, Sulphate of Ammonia.

WARNER & VAN DER BIESEN,
ZWOLLE, HOLLAND.
DIGGERS AND SUPPLIERS OF THE
FINEST DUTCH BOG-ORE.
(Natural Oxide of Iron.)
Best Percentages. For lowest Quotations to any Port, Station, or direct into Works, please apply to—
LONDON OFFICES: 6, LEATHER LANE, E.C.

SULPHURIC ACID.
SPECIALLY prepared for Sulphate of AMMONIA Makers by
CHANCE AND HUNT, LIMITED,
Works: OLDBURY, WEDNESBURY, AND STAFFORD.
Address Correspondence and Inquiries to OLDBURY, WORCS.
Telegrams: "CHEMICALS, OLDBURY."

GAS-WORKS requiring Extensions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, Dewsbury, who make a Speciality of Catering for the Smaller Gas Concerns. Prices Reasonable; quality and results, the *best*. Satisfaction Guaranteed.

KRAMERS AND AARTS WATER-GAS PLANT.
K. & A. WATER-GAS COMPANY, LTD.
89, VICTORIA STREET, S.W.

AMMONIA.
Consumers in any form are invited to correspond with CHANCE AND HUNT, LTD., Chemical Manufacturers, OLDBURY, WORCS.

OXIDE OF IRON.
(NATURAL.)
SPENT OXIDE PURCHASED.
BALE'S FIRE CEMENT.
PAINT FOR GAS-WORKS.
BALE & CHURCH,
5, CROOKED LANE, LONDON, E.

SULPHURIC ACID.
SPECIALLY prepared for the Manufacture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.
with which is amalgamated WM. PEARCE & SONS, LTD.
86, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341 AVENUE.

AMMONIA Waste Liquor Disposal.
Purification Plant.
Results Guaranteed. No Working Costs.
JOHN RADCLIFFE, Chemical Engineer, EAST BARNET.

JOHN W. LEITCH AND COMPANY,
MILNSBRIDGE CHEMICAL WORKS,
near HUDDERSFIELD.
The Manufacture of
PURE BENZOL FOR GAS ENRICHMENT
a speciality.

LUX'S GAS PURIFYING MASS.
See Advertisement on First White Page.
FRIEDRICH LUX, LUDWIGSHAFEN-AM-RHEIN.

F. BOYALL, Contractor for Painting GASHOLDERS, OIL-TANKS, ROOFS, and all kinds of LOFT and other PAINT WORK.
70, Balcorne Street, Well Street, HACKNEY, N.E.

GAS TAR wanted,
BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, SUNDERLAND, AND WAKEFIELD.

BRISTOL RECORDING GAUGES AND THERMOMETERS.
J. W. & C. J. PHILLIPS, 23, COLLEGE HILL, LONDON, E.C., and 25, BRIDGE END, LEEDS.

SPENCER'S PATENT HURDLE GRIDS.
THE very best Patent Grids for Holding Oxide Lightly.
See Illustrated Advertisement, June 21, p. 914.

GAS PLANT for Sale—We can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
FIRTH BLAKELEY, SONS, AND COMPANY, LIMITED, Thornhill, DEWSBURY.

IT is Worth Your While to Buy Direct.
The RELIANCE LUBRICATING OIL COMPANY supply the best value in NON-CORROSIVE LUBRICANTS—viz., Motor Waggon Oil, 1s.; Motor Car Oil, 2s.; Engine, Cylinder, and Machinery Oils, 1s.; Axle Oil, 10½d.; Exhauster Oil, 10d.; Special Cylinder Oil, 1s. 4d.; 650 T Cylinder, 2s.; Special Engine Oil, 1s. 4d.; Gas Engine and Oil Engine Oil, 1s. 6d.; Refrigerator, 1s. 9d.; Renown Engine Oil, 11½d.; and Astral Disinfectant, 2s. 6d. per gallon. Barrels free, carriage paid. Solidified Oil, 25s. cwt.
THE RELIANCE LUBRICATING OIL COMPANY, 19 & 20, Water Lane, Tower Street, LONDON, E.C.

CORRESPONDENCE CLASSES.
GAS Engineering and Gas Supply.
City and Guilds of London Institute.
Teacher: HERBERT LEES (Silver Medallist), Assoc.M.Inst.C.E., Engineer and Manager of the Hexham Gas Company, Lecturer at Rutherford College, Newcastle-on-Tyne.
For Terms, &c., address ELVASTON ROAD, HEXHAM.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, Rose Mount Iron-Works, Elland.

STRETFORD GAS COMPANY.

SECRETARY.

THE Chairman and Directors Thank all Applicants for their Offers, and Inform them that the Vacancy HAS NOW BEEN FILLED.

Stretford, July 28, 1910.

GENTLEMAN, for some Years Connected with a Water Company now absorbed by Municipality, SEEKS OCCUPATION with either a Gas or Water Concern. Thoroughly Acquainted with the whole of the Official Work, Registration, Accounts, and Rating. Good Organizer. Excellent Testimonials and References as to Abilities and Character. Small Initial Salary accepted with prospect of advance on work proving satisfactory.

Address No. 5265, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, Two or Three Expert DRAUGHTSMEN, accustomed to Gas Plant and Constructional Work.

Apply, by letter, stating Age, Experience, and Salary required, to Messrs. Newton, Chambers, and Co., Ltd., Thorncliffe Iron-Works, near Sheffield.

REPRESENTATIVE required to introduce and push important article used in all Gas-Works. Must have Good Connections and be good Salesman.

Please write, stating Qualifications, District, and References, to: "Gas-Works," care of Streets, 30, Cornhill, E.C.

WANTED by a Firm of Ironfounders and Chemical Engineers, with Established Trade among Chemical Manufacturers, to undertake the Sole Rights of Making and Selling Chemical Specialities in Great Britain.

Apply No. 5262, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, immediately, Two or Three DRAUGHTSMEN, fully Experienced in the Design of Modern Gas Plant.

Apply, by letter, Stating Age, Qualifications, and Salary required, to No. 5268, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

COUNTY BOROUGH OF STOCKPORT.
(Gas Department.)

OUTSIDE SUPERINTENDENT.

THE Gas Committee are prepared to receive APPLICATIONS for the above Position, Forms for which may be obtained from the Engineer, Portwood Gas-Works, and must be returned not later than the first post on Wednesday, Aug. 10, 1910.

Commencing Salary, £130 per Annum.

Robert Hyde,
Town Clerk.

Town Hall, Stockport,
July 29, 1910.

SILSDEN URBAN DISTRICT COUNCIL.

APPLICATIONS are invited for the Position of GAS MANAGER to the above Council.

The Salary will be at the rate of £100 per Annum, together with House, Coal, and Gas free.

Applications for the above Appointment, endorsed "Gas Manager," giving Age, Qualifications, previous Experience, and the date when Duties can be commenced, accompanied by *copies* of not more than Three recent Testimonials, must be sent to the undersigned not later than Six p.m. on Friday, Aug. 5, 1910.

Applicants must state Experience with Sulphate of Ammonia and Regenerator Furnaces.

John Driver,
Clerk.

Town Hall, Silsden,
July 29, 1910.

GASHOLDERS—Splendid 45 feet diameter and New STEEL TANK, fixed Complete to Plan and Specification; also 14 feet and 16 feet Diameter GASHOLDERS, with STEEL TANKS. Can be seen temporarily erected. Re-erected Cheap for immediate Sale.

Firth Blakeleys, Thornhill, Dewsbury.

FOR Disposal—10-H.P. Portable Steam-ENGINE, practically new, by Marshall and Sons, Gainsborough, insured by National (90 lbs. pressure). 4-H.P. Horizontal STEAM-ENGINE, 5-H.P. Horizontal STEAM-ENGINE. BOILER TANK $\frac{7}{16}$ in. Plate, capacity 3070 gallons, absolutely sound. Cheap. Stationary STEAM CRANE, long jib. Offers Solicited.

W. Johnson, Junr., New Hythe, Kent.

PURIFIERS FOR SALE.

THE Malvern Urban District Council are open to receive OFFERS for the following PURIFIERS: Two 16 ft. by 12 ft. by 5 ft.; Four 16 ft. by 8 ft. by 5 ft.; and Two Four-Way Valves and Connections.

Permission to View and further Particulars can be obtained from the undersigned.

The highest or any Tender will not necessarily be accepted.

By order,
W. J. Rendell Baker,
Engineer and Manager.

IRISH ASSOCIATION of GAS MANAGERS.

President:
Mr. R. HARRISON, Monaghan.

THE

ANNUAL MEETING

Of the Association

WILL BE HELD IN THE

BANQUET HALL, CITY HALL, BELFAST,

ON TUESDAY, AUG. 9, 1910.

The Chair to be taken at 11.30 a.m. by the LORD MAYOR.

Business: Report of Committee; Admission of New Members; Election of Office Bearers; Revision of Bye-Laws; President's Address; Reading of Papers, &c.

Papers to be Read.

1. "Exhausters in Small Gas-Works," by Mr. C. Bryan Donkin, Birmingham.
2. "Distribution Pressures, Past, Present and Future," by Mr. Wm. H. Roberts, Newtownards.

By invitation of the President, Light Refreshment will be partaken of about 2 o'clock p.m.

The Members and their Friends will dine together at Ye Olde Castle Restaurant at Six o'clock p.m. Tickets 3s. 6d. each.

For the following day, an Excursion has been arranged for the Members and Lady Friends. Train will be taken from Belfast to Parkmore, whence a drive will be taken to Glenariff and on to Garron Tower, returning *via* Larne. Tickets (inclusive) 10s., Applications for which should be received by Aug. 3.

Geo. Airth,
Hon. Secretary and Treasurer.

Dundalk, July 23, 1910.

FOR DISPOSAL—Brick Plant complete. Including 400,000 Place and Hard Stock BRICKS, 15s. to 25s. per Thousand f.o.r. Maidstone. 12-H.P. Portable STEAM-ENGINE by Marshall, of Gainsborough, insured 90 lbs. Steam by National, nearly as good as when delivered from Workshops, £140. High-Pressure BOILER, new, insured 200 lbs. Steam. Suitable for 2-Ton Lorry, £20. 4-H.P. Horizontal STEAM-ENGINE, £5. 5-H.P. ditto, £6. Cheap 8-H.P. Portable STEAM-ENGINE £25. Offers solicited.

Full Particulars on Application to Wm. Johnson, June., New Hythe, Larkfield, Kent.

BOROUGH OF HEYWOOD.

THE Gas Committee invite Tenders for the Supply of TUBES and FITTINGS, SULPHURIC ACID, and TINNED GOODS.

Specification and Form of Tender may be obtained upon Application to Mr. W. Whatmough, Gas Manager.

Sealed and endorsed Tenders to be sent to me not later than Nine a.m. Monday, Aug. 8, 1910.

By order,
Geo. G. Bouchier,
Town Clerk.

Municipal Buildings, Heywood,
July 20, 1910.

HEBDEN BRIDGE AND MYTHOLMROYD GAS BOARD.

TENDERS FOR GAS COAL.

THE above Board invite Tenders for the Supply of GAS COAL as required by them during the next Twelve Months, at their Gas-Works, Crown Nest, Hebden Bridge.

Tender Forms and Further Particulars may be obtained from Mr. E. J. Wellens, Engineer and Manager, Gas Offices, Carlton Street, Hebden Bridge.

Sealed Tenders, endorsed "Tender for Gas Coal," must be addressed to James Simpson, Esq., Chairman, Gas Board, Offices, Carlton Street, Hebden Bridge, to be delivered on or before Monday, Aug. 8, 1910.

R. Crabtree,
Clerk to Gas Board.

Gas Offices, Carlton Street,
Hebden Bridge, July 23, 1910.

BOROUGH OF ROCHDALE.
(Gas Department.)

TENDERS FOR OXIDE OF IRON
(New and Spent).

THE Gas and Electricity Committee of the above Corporation invite TENDERS for the Purchase of about 300 Tons of SPENT OXIDE OF IRON containing upwards of 50 per cent. of Sulphur, and also for the Supply of about 300 Tons of NEW OXIDE.

The Spent Material will be delivered free into Waggons at the Milnrow Road Sidings of the Lancashire and Yorkshire Railway Company, at Rochdale, and the Purchaser must provide the necessary Waggons.

Tenders for the new Material must be accompanied by an Analysis; and the percentage of moisture Guaranteed must be stated.

Any further Information may be obtained on Application to Mr. T. Banbury Ball, the Manager at the Gas-Works, who will supply Samples of the Spent Material, and to whom Samples of New Oxide should be sent.

Tenders, endorsed "Oxide," addressed to the Chairman of the Gas and Electricity Committee, must be sent in to me not later than Noon on Wednesday, Aug. 17, 1910.

By order,
Wm. Henry Hickson,
Town Clerk.

Town Hall, Rochdale,
July 28, 1910.

COUNTY BOROUGH OF DEVONPORT.
(Gas Department.)

TENDERS are invited for the Supply of a RETORT-HOUSE GOVERNOR.

Further Particulars may be obtained from the undersigned.

Tenders, endorsed "Governor," addressed to the Town Clerk, Devonport, must be delivered on or before Aug. 6, 1910.

W. P. Tervet,
Engineer and Manager.

SULPHATE OF AMMONIA PLANT.

THE Accrington District Gas and Water Board are prepared to receive Drawings, Specifications, and TENDERS for a Modern 3 Tons per day Plant, erected Complete at the Great Harwood Works of the Board. Taylor's Saturator.

By order,
C. Harrison,
Engineer and General Manager.

Offices of the Board:
St. James' Street, Accrington,
July 26, 1910.

URBAN DISTRICT COUNCIL OF BANGOR (CO. DOWN).

THE Council of the above Urban District invite TENDERS for the Supply and Erection of IRONWORK, VALVES, &c., for Two Concrete PURIFIERS, each 20 feet square, at their Gas-Works.

Drawings and Specifications can be had on Application to Mr. B. Mitchell, Gas Manager, at the Works.

Tenders to be delivered not later than Twelve o'clock noon on Tuesday, the 16th of August, 1910, endorsed "Tender for Purifiers," and addressed to Mr. James Milliken, Town Clerk, Bangor (Co. Down).

J. Milliken,
Clerk to the Council.

Town Hall, Bangor (Co. Down),
July 26, 1910.

CORPORATION OF HAVERFORDWEST.

COAL.

TENDERS are invited for the Supply of about 1800 Tons of Double Screened GAS COAL of the Very Best Quality, to be delivered at the Haverfordwest Railway Station or at the Gas-Works Quay, Haverfordwest, by water communication, in quantities as required by the Gas Manager during the Year commencing on the 1st of September next, for the Corporation of Haverfordwest.

Tenders by Aug. 13.

Forms of Tender and further Particulars of

R. T. P. Williams,
Town Clerk.

Haverfordwest, July 30, 1910.

CITY OF BRADFORD.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Gas Committee of the Bradford Corporation are prepared to receive TENDERS for the Supply of Best GAS COAL, COBBLES, NUTS, and CANNEL, all to be well Screened, Dressed, and free from Shale and Pyrites, to be Delivered at the several works of the Corporation during the period of One Year, commencing on the 1st day of October next.

Form of Tender, with any further Information required, may be had on Application to Mr. Chas. Wood, Gas Engineer, Town Hall.

Sealed Tenders, endorsed "Tender for Coal," to be sent to me on or before Thursday, the 25th of August next.

The Contracts will be let subject to the Fair Contracts Clauses of the Corporation, which may be seen at the Town Clerk's Office, and which the accepted Contractors will be required to sign.

The lowest or any Tender will not necessarily be accepted.

Frederick Stevens,
Town Clerk.

Town Hall, Bradford,
July 26, 1910.

YEOVIL CORPORATION.
(Contracts Nos. 2, 3, 4, 5, and 6.)

THE Corporation of the Borough of Yeovil are prepared to receive TENDERS for the Construction of certain WORKS and the Additions to, and Alterations of, certain existing Works at their Sewage Disposal Works at Pen Mill and the Sewage Lift Works at Dodham Bridge, respectively. That is to say:—

Contract No. 2—The PERCOLATING BED and other Works and the Additions to, and Alterations of, certain existing Tanks and Works at the Sewage Disposal Works at Pen Mill.

Contract No. 3—The ENGINES and PUMPS and other MACHINERY to be Erected and set to work at the Sewage Disposal Works and the Sewage Lift Works at Dodham Bridge.

Contract No. 4—The WEIR PLATES and other Iron and Steel Articles required at the Sewage Disposal Works.

Contract No. 5—The VALVES and PENSTOCKS required at the Sewage Disposal Works.

Contract No. 6—The Cast-Iron Straight Socket PIPES and Special PIPE CASTINGS required at the Sewage Disposal Works.

Drawings may be inspected and Specifications and Forms of Tender in respect of Contract No. 2, and Contract No. 3, may be obtained on payment of the sum of Two Guineas each, and in respect of the three Contracts Nos. 4, 5, and 6, on payment of the sum of Two Guineas (to be returned in each case on receipt of *bonâ-fide* Tenders), on Application at the Office of the Borough Surveyor at Yeovil, or at the Office of Messrs. T. & C. Hawksley, Civil Engineers, Caxton House, Westminster, S.W., on and after Tuesday, the 2nd day of August, 1910; and Tenders must be addressed to the Town Clerk, and delivered at his Office in Yeovil at or before noon on Tuesday, the 23rd day of August, 1910.

The Corporation do not bind themselves to accept the lowest or any Tender.

Henry B. Batten,
Town Clerk.

Yeovil, July 26, 1910.

NEW MILLS URBAN DISTRICT COUNCIL.

TENDERS FOR GAS COAL, &c.

THE New Mills Urban District Council invite TENDERS for the Supply of 3000 Tons of Best GAS COAL, and 500 Tons of CANNEL for the Year ending June 30, 1911.

Forms of Tender and full Particulars may be had on Application to the Gas Manager.

Tenders, properly endorsed, to be sent to me, the undersigned, not later than Aug. 16, 1910.

The Council do not bind themselves to accept the lowest or any Tender.

J. POLLITT,
Clerk.

Town Hall, New Mills,
July 28, 1910.

BRENTFORD GAS COMPANY.

NOTICE is Hereby Given, that a HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors will be held at St. Ermin's Hotel, Caxton Street, Westminster, on Friday, the 5th of August next, at Half-past Two o'clock, to transact the usual Business, including the declaration of a Dividend for the Half Year ending the 30th of June last.

By order,
WILLIAM MANN,
Secretary.

Office, Brentford,
July 19, 1910.

BROMLEY AND CRAYS GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held on Thursday, the 4th day of August, 1910, at Six o'clock p.m. precisely, and on this occasion

AT THE WORKS OF THE COMPANY, IN HOMESDALE ROAD, BROMLEY, KENT,

to receive the Report of the Directors; the Balance-Sheet certified by the Auditors; to declare a Dividend; and to Transact generally the Business of a General Meeting.

The TRANSFER BOOKS WILL BE CLOSED from the 20th of July to the 4th of August, 1910, both days inclusive.

By order of the Board.
HENRY W. AMOS,
Secretary.

Offices: 156, High Street,
Bromley, Kent, July 20, 1910.

SOUTHGATE AND DISTRICT GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Company will be held at the Company's Offices, No. 5, Great Winchester Street, Old Broad Street, in the City of London, on Thursday, the 18th day of August inst., at 3.45 o'clock p.m. precisely, to receive the Report of the Directors and the Accounts of the Company for the Half-Year ended the 30th of June, 1910; to declare Dividends; and for other purposes.

The TRANSFER BOOKS of the Company WILL BE CLOSED from the 5th to the 18th of August, both days inclusive.

ERNEST L. BURTON,
Secretary.

Secretary's Office, 5, Great Winchester Street,
Old Broad Street, London, E.C.,
Aug. 2, 1910.

THE Proprietors of the Patents Nos. 7188, of 1901, for "IMPROVEMENTS IN, OR RELATING TO, ACETYLENE GAS-LAMPS OR GENERATORS;" 11,612, of 1902, for "ACETYLENE GAS-LAMPS FOR TABLE USE;" 23,629, of 1903, for "IMPROVEMENTS IN ACETYLENE GAS-GENERATORS;" 10,185, of 1905, for "IMPROVEMENTS IN ACETYLENE GAS GENERATORS," are desirous of entering into Arrangements, by way of LICENSE and Otherwise, on Reasonable Terms, for the purpose of EXPLOITING the same and ensuring their Full Development and Practical Working in this Country. All Communications should be addressed in the first instance to HASELTINE, LAKE, & Co., Chartered Patent Agents and Consulting Engineers, 7 & 8, Southampton Buildings, Chancery Lane, LONDON, W.C.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MESSRS. A. & W. RICHARDS beg to notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to MESSRS. A. & W. RICHARDS, at 18, FINSBURY CIRCUS, E.C.

Just Published. Price 1s. net.

THE SALE OF GAS APPARATUS

BY

J. PATER WIATT.

Author of "Chemistry in Physics," "Internal Combustion Engines," &c., &c.

London: WALTER KING, 11, Bolt Court, Fleet St., E.C.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER
Gas Engineers' Agents and Contractors for METERS, FIRE-CLAY GOODS, OXIDE OF IRON AND ALL OTHER GAS APPARATUS.
Inquiries Solicited.
Telegrams: "DARWINIAN, MANCHESTER."
Telephone 1806.

ARMSTRONG'S
PATENT
CANDLE SAFETY LAMPS.
Are a great improvement on Oil, giving a good Light, requiring little or no Cleaning, and when once lighted no further attention is necessary. The Candles are made to burn 5, 7, or 9 hours.

43, MANCHESTER STREET, GRAY'S INN ROAD, W.C.

MIRFIELD GAS COAL.
UNEQUALLED.
Sperm Value 878·85 lbs. per Ton.
Please apply for Price, Analyses, and Report, to the
MIRFIELD COLLIERY COMPANY,
RAVENSTHORPE, NEAR DEWSBURY.
LONDON: 16, Park Village East, N.W.

KOPPERS' PATENT
CHAMBER OVENS.
Results obtained which have never been Surpassed by any other System of Carbonization.
Plants at Work and under Construction for the production of **18,000,000** cubic feet of Gas per Day.
See our large Advertisement appearing in alternate Issues of the "JOURNAL."
The KOPPERS'
COKE OVEN AND BYE-PRODUCT CO.,
301, Glossop Road, SHEFFIELD.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.
Manufacture and keep in Stock at their Works (also large Stock in London)
PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Makers of HORSLEY SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts, and Covers, and rendering Leakage impossible.

BIRTLEY IRON COMPANY,
ESTABLISHED 1820,
Owners of the Birtley Iron Works and Pelaw Main Collieries,
GENERAL ENGINEERS & IRONFOUNDERS.
Makers of Cast-Iron PIPES and CONNECTIONS for Gas, Water, Steam, Electrical, Sanitary, and other purposes; also TANKS, COLUMNS of every description, Hydraulic, Gas, and Colliery PLANT, &c.
Illustrated Catalogue, giving complete list of our manufactures, on application.
Works: BIRTLEY, CO. DURHAM.
Newcastle-on-Tyne Offices: MILBURN HOUSE.

ALL the
BOYS CALORIMETERS
which have been in daily use in all the Official Testing-Stations in London for the last Three Years
WERE MADE BY
JOHN J. GRIFFIN & SONS,
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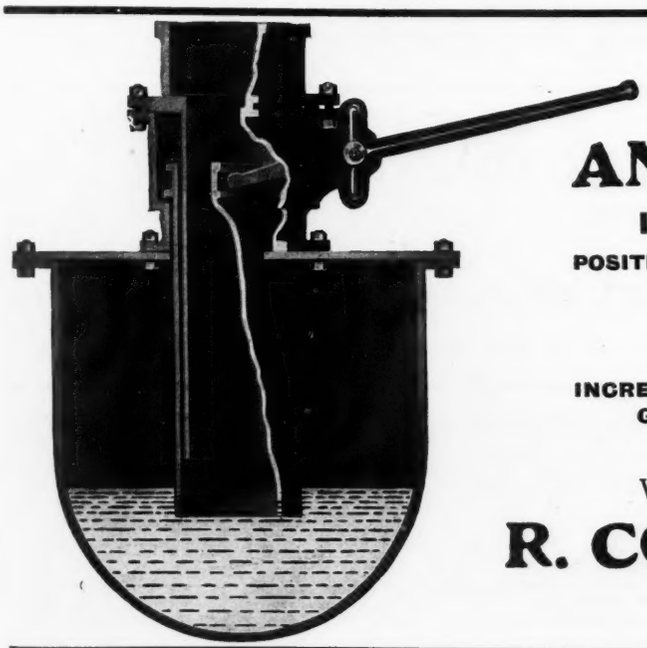

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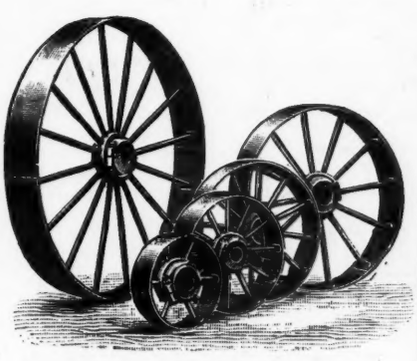

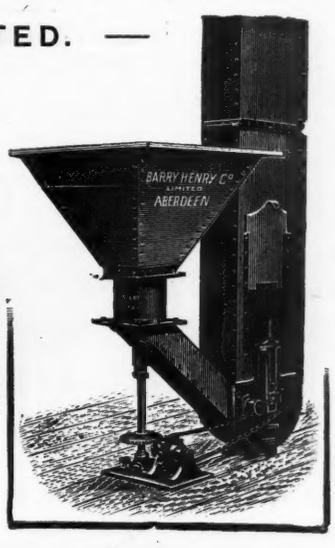

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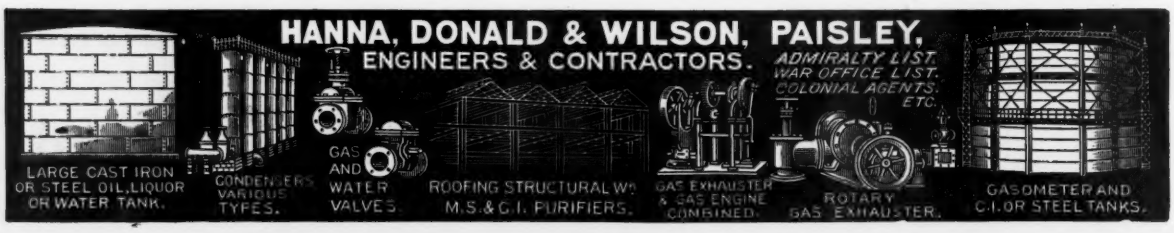
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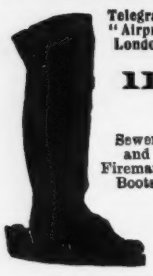

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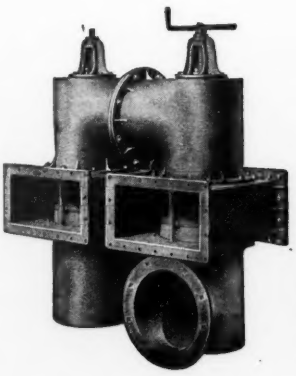

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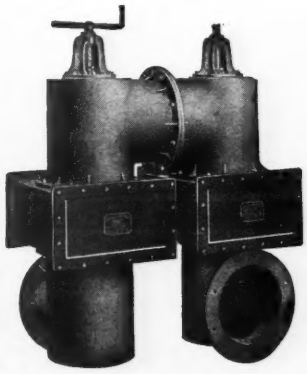

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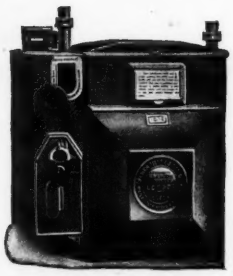

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Inverted Arc Lamp, Fig. 623.

Storm Proof—

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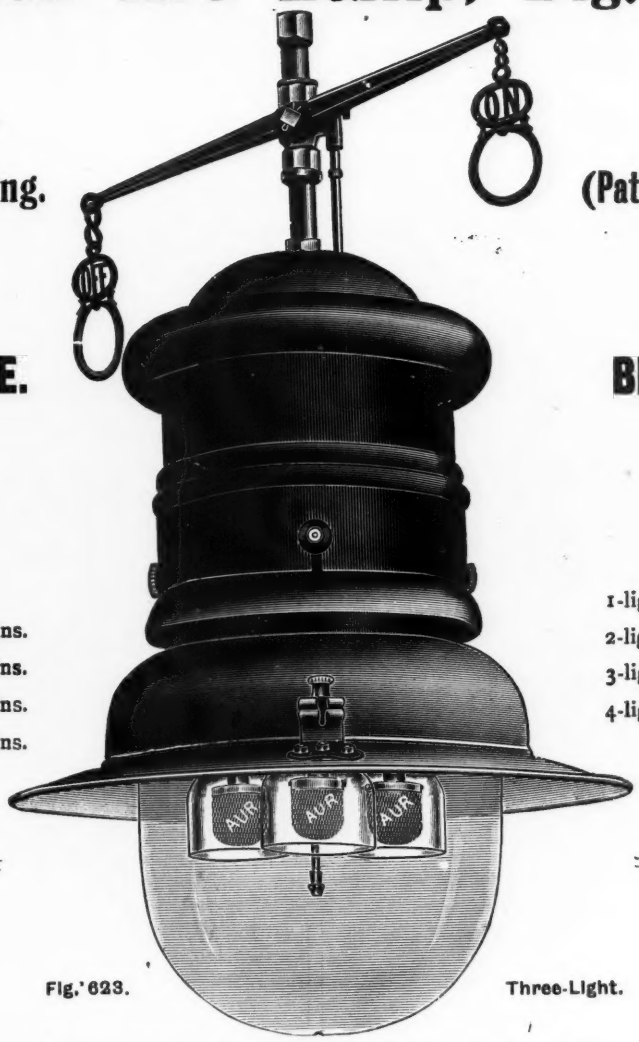

Fig. 623. Three-Light.

Height over all.

1-light . . .	1 ft. 8 ins.
2-light . . .	2 ft. 4 ins.
3-light . . .	2 ft. 4 ins.
4-light . . .	2 ft. 7 ins.

Width over all.

1-light . . .	1 ft. 1 in.
2-light . . .	1 ft. 5 ins.
3-light . . .	1 ft. 5 ins.
4-light . . .	1 ft. 8 ins.

ENAMELLED Green Steel Casing, fitted with Welsbach-Kern Inverted Burners, Gas and Air Regulators operated from outside. Sliding Door to give access to Burners for cleaning purposes. Fitted with Magnesia Nozzles, Welsbach Mantles, and Glass Mantle Protectors. Complete as shown. Highly efficient and regenerative.

	Gas per hour.	*C.P.*	*Steel.*	*Copper Case.*		*Gas per hour.*	*C.P.*	*Steel.*	*Copper Case.*
1-light	4 feet	125	**30/-**	**5/-** extra.	3-light	12 feet	400	**52/6**	**6/-** extra.
2-light	8 feet	260	**47/6**	**6/-** extra.	4-light	16 feet	550	**72/6**	**9/-** extra.

All on or off, or One light on and the rest off, **7/6** per Lamp extra. Cup and Ball, **3/6** per Lamp extra.

RENEWALS.

Glass Mantle Protectors (Fig. 623) **3/4½** per dozen, or in case lots of 5 gross, **33/-** per gross.

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*		*1-Light.*	*2-Light.*	*3-Light.*	*4-Light.*
Clear Glass Globes, each	**2/3**	**5/9**	**5/9**	**9/-**	Wired Globes, extra each	**2/-**	**2/-**	**2/9**	**3/6**
„ „ „ In Case lots per dozen.	**19/6**	**57/9**	**57/9**	**93/-**	Parabolic Reflector, extra „	**3/6**	**6/-**	**7/6**	Not made
Case contains . .	*80*	*18*	*18*	*12*	Welsbach Mantles, each **6d.** subject as usual.				

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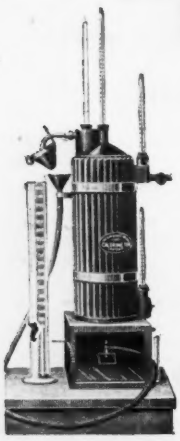

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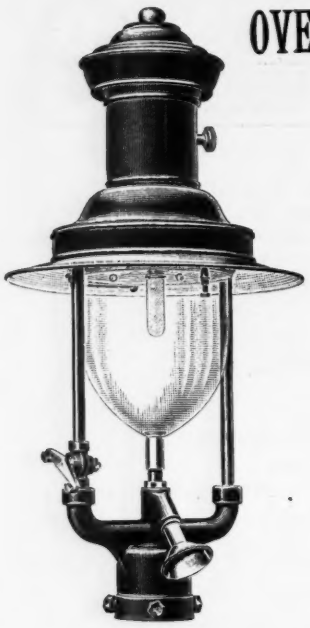

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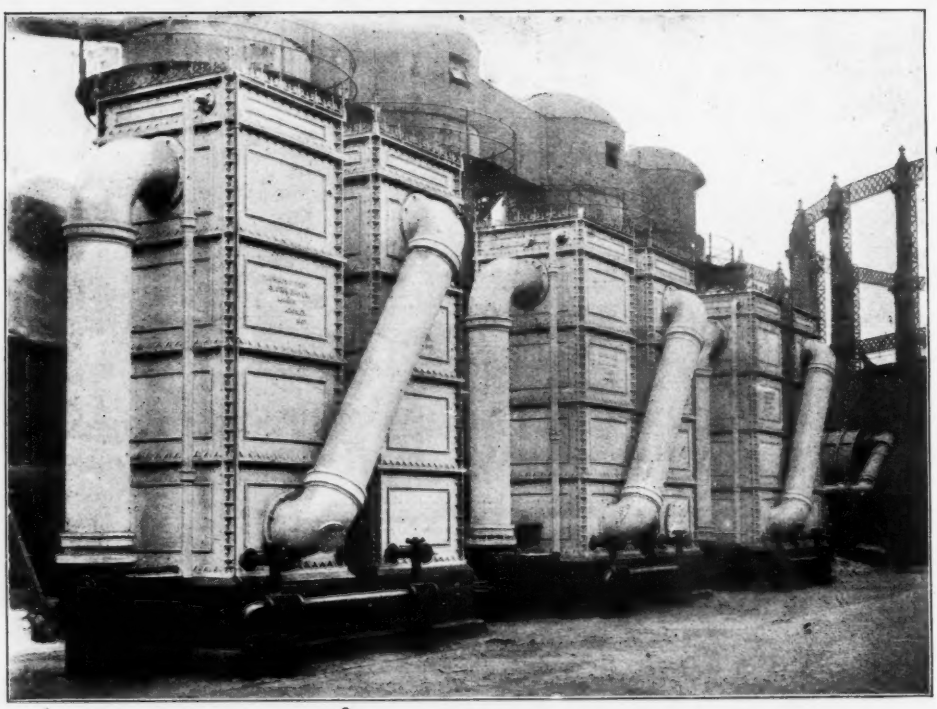

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